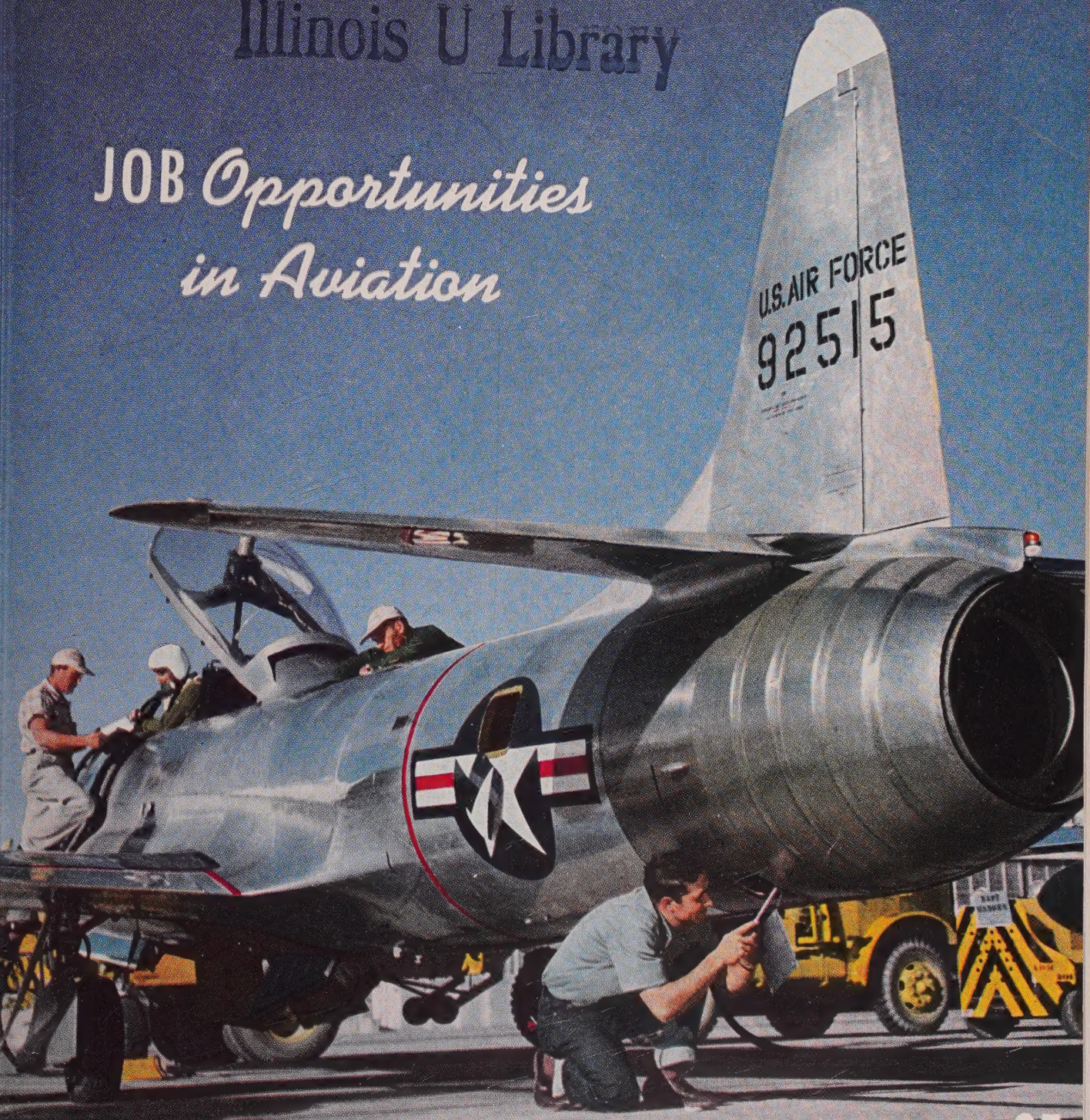
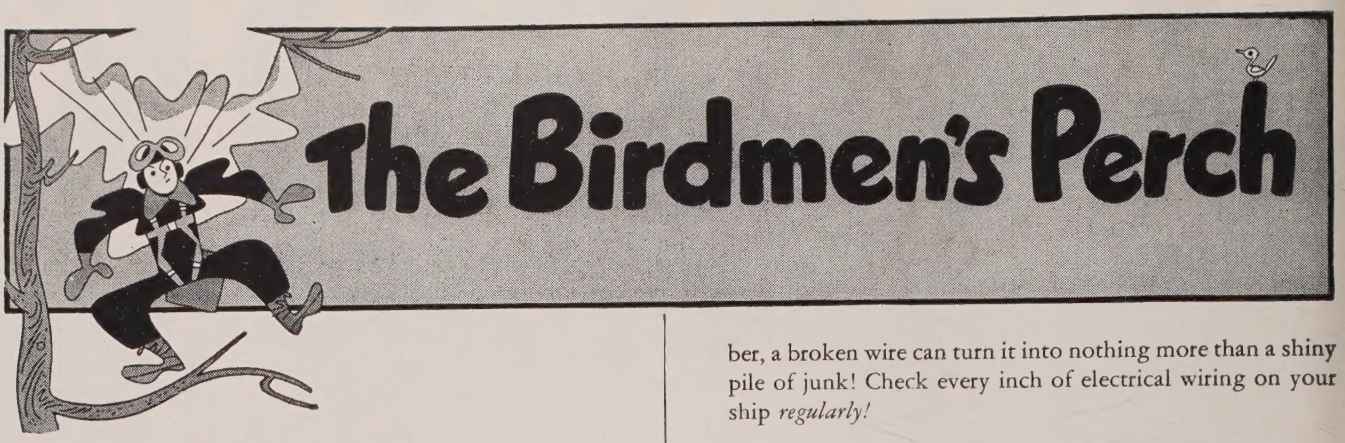
SKYWAYS

JOB *Opportunities in Aviation*



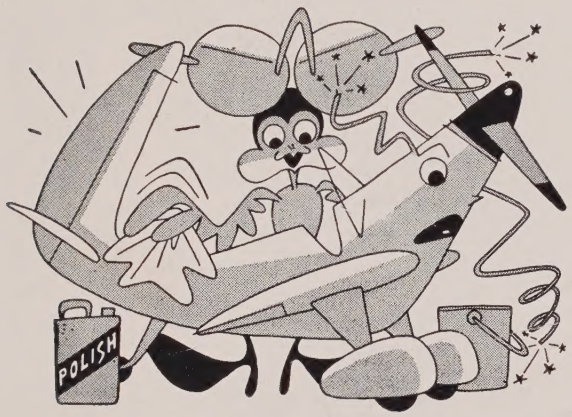
MAR. 1951 25¢

lot's Report...Tricycle-



We've got our candidate for World's No. 1 Optimist!

He's the guy who figures his plane's electrical system will take care of itself. Yes sir—that joker will spend all day Saturday polishing up his paint job, but forget all about the fine-gauge wires that carry the juice from the battery or generator!



True, exposed wiring is usually insulated and fairly durable, but it won't last forever. Wiring, the best you can get, does break and does short! Beyond the usual dangers of fire from a short circuit, a broken wire can kill your prop deader than a herring!

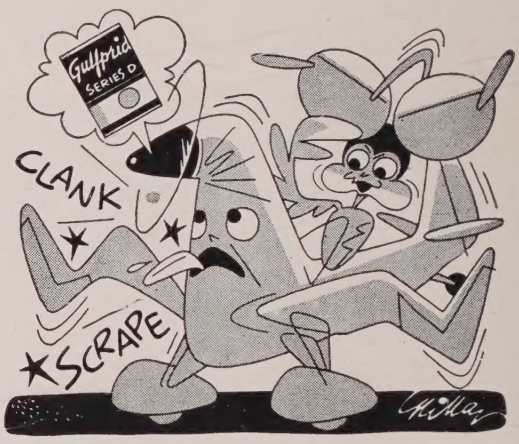
Naturally, you don't want circuit failure in the air. The only answer is to learn proper circuit maintenance and practice it . . . on the ground!

A shiny ship is one thing—but remember, a broken wire can turn it into nothing more than a shiny pile of junk! Check every inch of electrical wiring on your ship *regularly!*

P-S-S-T, FERDIE, THE SCRIPT!

Attention, all aviators! Does your engine clank and scrape? Are the valves nervous, the rings sullen and irritable?

Then, Boys and Girls, those engines need Gulfpride



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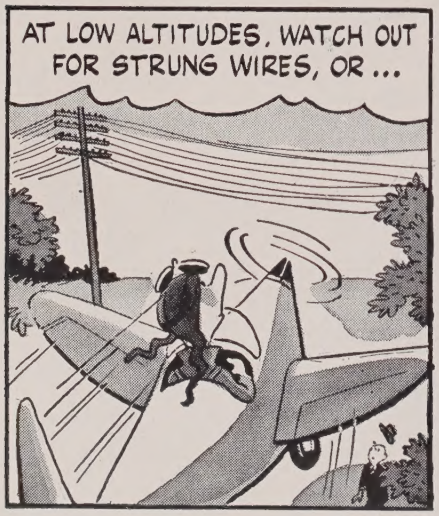
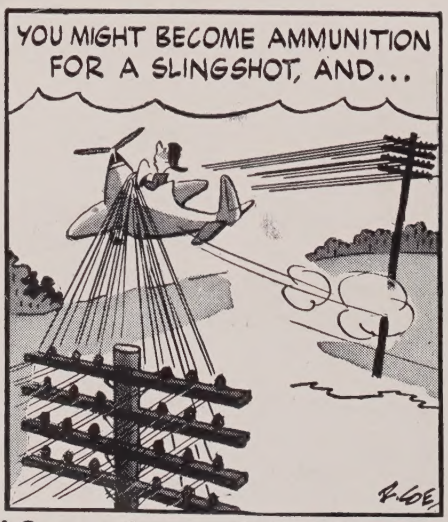
To wit, Gulfpride Aviation Oil—Series D—is the only aviation oil put through Gulf's exclusive Alchlor process to remove extra carbon and sludge formers!

Get hep and get engine-happy! Use Gulfpride Aviation Oil—Series D—exclusively and increase those periods between overhauls up to 100%.

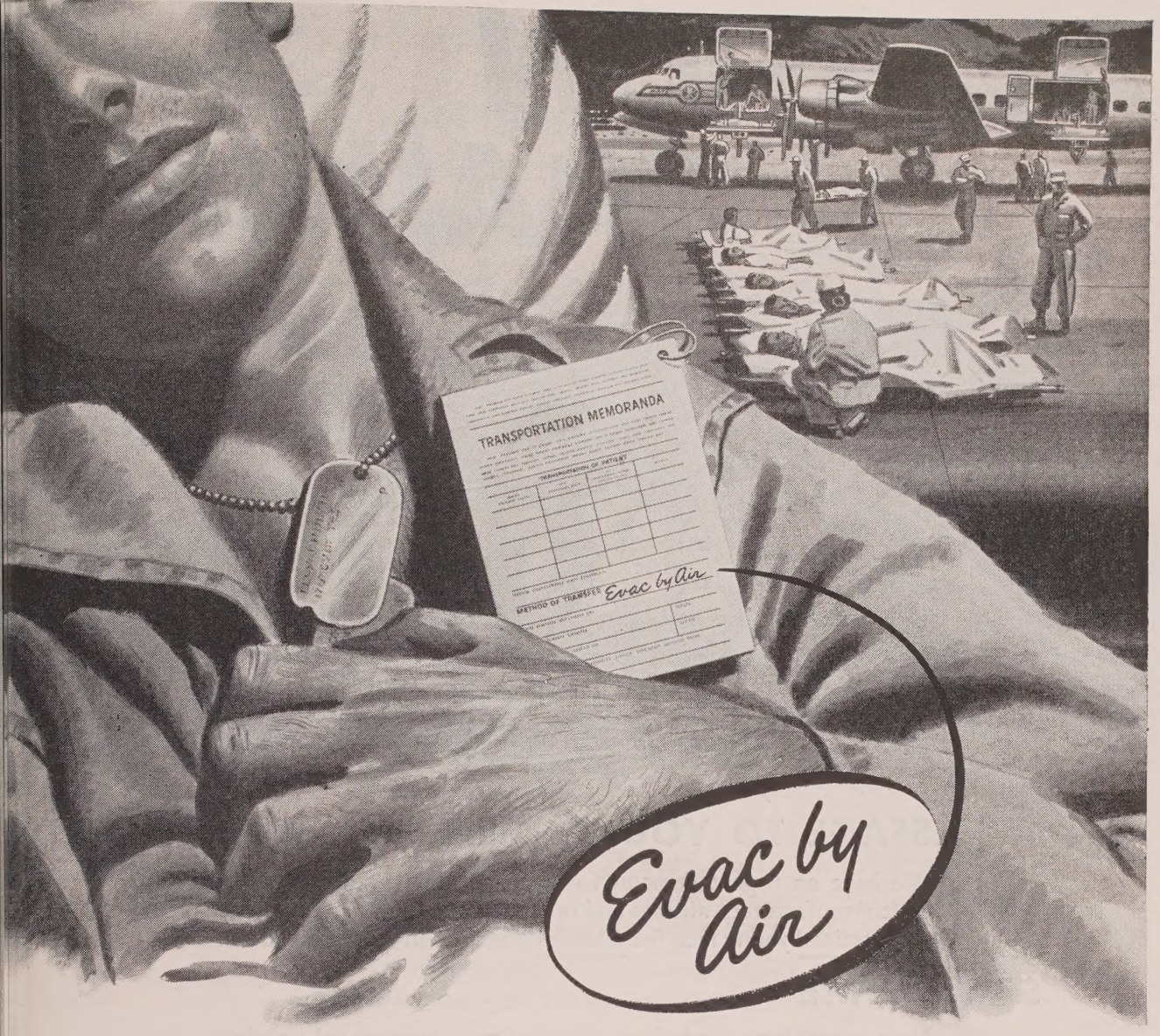
GULF

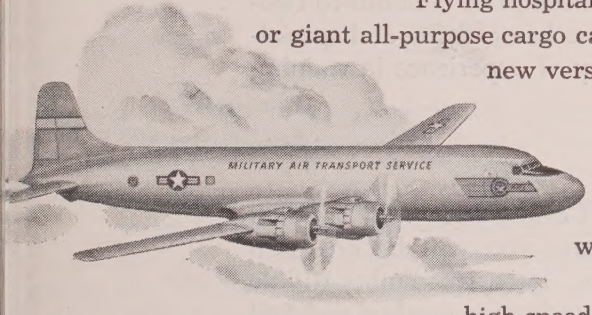
AVIATION PRODUCTS





Gulf Oil Corporation . . . Gulf Refining Company





Flying hospitals for evacuating the wounded... swift troop transports... or giant all-purpose cargo carriers—new airplanes such as the Douglas C-118A bring new versatility to the Military Air Transport Service. The C-118A, soon to be in service, is the Air Force designation for the DC-6A *Liftmaster*—a larger version of the famous DC-6 passenger transport. Flying payloads up to 30,000 lbs. at 320 mph with a range of about 1,740 miles, the C-118A will do *one-third more work* than the C-54 at *one-third less operating cost!* Thus Douglas answers the need for a high-speed, long-range *dependable* military air transport. Meanwhile, on the drafting board and in the laboratory, Douglas engineers and research experts continue to pioneer new and more advanced aircraft in the direction of turbo-prop, jet and rocket propulsion.

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There's a new Beechcraft metal propeller, and Lear VHF radio receiver, transmitter, and low frequency receiver, too. Safety and ruggedness? That's an *old* story to this sturdy plane! See your Beechcraft distributor for *all* the facts on this great, new Model C35. Or write on your company letterhead to Beech Aircraft Corporation, Wichita, Kansas, U.S.A. Scores of improvements, plus the Bonanza's famous qualities tested by more than 2,600 now in service, make it *the* buy for '51!

Beechcraft

BONANZA

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

Vol. 10, No. 3, March, 1951. SKYWAYS is published monthly by J. Fred Henry Publications, Inc., 444 Madison Ave., New York 22, N. Y. Printed in U.S.A. Single copy 25 cents. Subscription Prices: U. S., possessions, Canada and Pan-Am. Union $7.00 for three years, $5.00 for two years, $3.00 for one year; all other countries add $1.50 per year for postage. Six weeks required for address changes (give both old and new address.) Manuscripts, drawings, other material must be accompanied by stamped, self-addressed envelope. SKYWAYS is not responsible for unsolicited materials. Reentered as second-class matter April 16, 1948, at the post office at New York, N. Y., under the act of March 3, 1879.

SKYWAYS

Cover: Lockheed F-94 — *March, 1951*

Hell Comes to a B-36 . . . . . Terry Kay 8
One by one, 17 airmen bailed out into the night from a B-36

Civil Air and National Defense . . Donald W. Nyrop 10
Program planned to keep plane supplies available during emergency

Air War in Korea 12
Late news photos of USAF and Air Navy operations in Korean war

Pilot's Report: New Tricycle-Gear Cub
L. M. Horton 14
Newest in the Piper hangar is the tricycle-gear four-place Pacer

Story of a Stall . . . . . V. A. Prevette 16
CAA begins re-education program to teach new kind of stall recovery

Ridin' the Radio . . . . . J. Holahan 18
Electronic aviation makes possible civil all-weather flight

CAA's Own Little Island . . . . . Don Downie 20
The story of Wake Island, wholly governed by the CAA

Company Plane Pays . . . . . J. F. Brunner, Jr. 22
A company man shows why owning a company plane adds up to profit

Refuel in Air . . . . . Hermann Shoenen 24
British Meteor *is refueled 10 times, stays aloft over 12 hours*

Crash . . . and Walk Away . . . . . Dick Grace 28
Famed stunt flyer tells pilots how to crash land and be safe doing it

Farewell, The "Jug" . . . . . Sgt. S. E. Turner 30
Air Force looks back on the famed F-47 as the F-84 takes its place

Dilbert . . . . . S. H. Warner & Robt. Osborn 32
Sometimes the biggest air-lock is in the pilot's brain

Job Opportunities in Aviation
F'ward by Adm. DeWitt C. Ramsey, USN. Ret. 55
Korea Causes AF Build-Up . . . J. A. McCone 57
Aero-Engineer Job Specs . . Col. N. F. Silsbee 58
Survey Shows Skills Needed 62
Job Estimates 63
Employment Application 64

Attn; Pilots 5
Air Your Views 6
X-C 26
CAOA Report 34
Military Aviation 47

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Attention: PILOTS

t is now mandatory that aircraft entering the U. S. through Coastal Air Defense Identification Zones or across International oundary Air Defense Identification Zones om outside the U. S. to file flight plans nd make certain position reports. Also, anes entering or operating within Domestic ir Defense Identification Zones at 4,000 et or more above the immediate terrain are quired to file flight plans and make spe- fic position reports. Operators of planes ithout two-way radio in the Domestic Air efense Identification Zones must remain low 4,000 feet above the immediate terrain. Flight is prohibited over atomic plant eas, regardless of flight plan.

Domestic Air Defense Identification Zones:

orthwest: Area bounded by Eastern bound- y of Pacific ADIZ north of 43°00′ N; Cana- an border west of 49° N-114° W extend- g to eastern boundary of Pacific ADIZ, and ne 49°N-114°W, 47°N-114°W, 47°N-114°30′ , 46°N-114°30′W, 44°N-117°30′W, 43°N- 0°W, and then west along 43° N latitude eastern boundary of Pacific ADIZ.

n Francisco ADIZ: Area bounded by east- n boundary of Pacific ADIZ north of °17′N-121°23′W to 40°N-124°45′W, and the ne 40°N-124°45′W, 40°10′N-122°10′W, 39°- ′N-119°45′W, 36°10′N-119°45′W, and 35°- ′N-121°23′W.

s Angeles ADIZ: Area bounded by eastern undary of Pacific ADIZ from 32°30′ N-117° ′W, 35°17′N-121°23′W, and the line 35°17′ 121°23′W, 36°10′N-119°45′W, 36°N-118°W, °50′N-114°50′W, 32°42′40′ ′N-114°50′W, en along Mexican border to eastern bound- y of Pacific ADIZ at 32°30′N-117°15′W.

buquerque (Los Alamos) ADIZ: Area unded by a circle of 150 nautical miles dius centered at 35°54′N-106°08′W. (Flight hibited)

oxville (Oak Ridge) ADIZ: Area bounded a line 38°04′N-85°32′W, 38°06′N-82°36′W, °48′N-81°40′W, 35°28′N-81°17′W, 34°12′ 83°30′W, 34°12′N-84°30′W, 35°05′N-85°03′ , 36°10′N-86°30′W, 36°28′N-86°43′W, 37° ′N-85°32′W, and 38°04′N-85°32′W. (Flight hibited)

Atlantic: Area bounded by a line 44°30′ 66°45′W, 43°10′N-70°W, 42°40′N-70°10′W, PN-69°30′W, 41°15′N-69°30′W, 40°15′N- °30′W, 39°30′N-73°45′W, 37°N-75°30′W, °10′N-75°10′W, 35°10′N-75°10′W, 33°30′N- °W, 32°N-74°W, 40°N-64°W, and 44°30′ 66°45′W.

Pacific: Area bounded by a line 48°30′N- 5°W, 48°N-125°15′W, 46°15′N-124°30′W, PN-124°40′W, 40°N-124°45′W, 38°50′N- 1°W, 34°N-120°30′W, 33°15′N-118°30′W, °30′N-117°45′W, 32°30′N-117°15′W, then ng a line parallel to and approximately 7 les from the Mexican Coast to the points °N-114°40′W, 27°N-121°30′W, 38°N-129° 50′N-132°W, 51°N-130°W, and 48°30′N- 5°W.

ernational Boundary ADIZ

Canadian International Boundary ADIZ: om a point of 49°N-114°W along the U. S.- nadian Border to the Pacific Ocean, then st to eastern boundary of Pacific ADIZ 48°30′N-125°W; and from a point of W on the U. S.-Canada border east along border to the western boundary of the antic ADIZ at 44°30′N-66°45′W.

AIR YOUR VIEWS

Lightning vs. Mustang

Gentlemen:
How does the speed, range, rate of climb, etc., of the Lockheed P-38 *Lightning* compare with the North American F-51 *Mustang?*

R. NOTTURNO

Lynbrook, N. Y.

According to our information, here's how these two stack up:

	P-38	*F-51*
Top speed (25,000 feet)	*414 mph*	*488 mph*
Climb (at 5,000 feet)	*3,670 fpm*	*6,400 fpm*
Range	*460 miles*	*950 miles*

There were several different versions of these World War II planes. The figures given here are for the Lightning *night fighter, the* Mustang *interceptor.*—ED.

Gee, Thanks.

Gentlemen:
I'm just one of the many fly-boys around the country who wishes to express his appreciation for your informative and accurate SKYWAYS. Pilot's Reports by Don Downie leave little to be desired and he has been most impartial in his reporting on different equipment. (I know as I've checked some ships against his reports). NAVICOM is right on the ball, too. By the way, where are the mixture controls on Godfrey's DC-3? They aren't shown on your layout in the December issue.

For Lt. M. W. James, Lowry AFB, inquiring about a Culver PQ-14, there is one at Glendale, California, with a for-sale sign on it. There also is one at Willow Run, Detroit. Another thought . . . he might contact Lee Ryan, Box 1752, Houston, Texas, who handles some surplus aircraft. If Ryan can't get one, I don't think anyone can.

B. CHICK

Columbus, Ohio

Thanks for your comments and the very-welcome PQ-14 information. The mixture control on Godfrey's plane are the two knobs marked "M" just to the right of the throttle quadrant. Note the picture on the bottom of page 10, and those two "M" knobs below the Carburetor Heat controls are the mixture controls. Okay?—ED.

Mig-15's vs. Mustangs

Gentlemen:
Early in November there appeared in many newspapers an article stating that 15 new Russian-built MIG-15's had tangled with World War II *Mustangs*, and lost. I would like you to explain how 15 of these new Russian interceptors that travel at about 640 mph could lose an air battle to F-51 *Mustangs* that travel about 450 mph. These same articles stated the pilots of the jets carried out their maneuvers in excellent fashion. There is something fishy.

RICHARD NOLAN

Lynbrook, N. Y.

That's not as strange as it sounds, Mr. Nolan. Several years ago, in January, 1943, to be exact, SKYWAYS featured an article entitled "A Camel Outblows a Hurricane," by David C. Cooke. In this article, Author Cooke told how a slow Sopwith Camel *of World War I days took on a* Hurricane *of World War II. Both planes were equipped with gun cameras to record the experimental "battle." The much faster Hawker* Hurricane *would come boring in on the slow* Camel, *but the pilot of the* Camel *would kick rudder and easily bank out of the way so that the* Hurricane's *imaginary bullets went flying by, never touching the* Camel. *In short, the plane with the slower speed could turn inside the faster airplane, and also could turn more sharply without fear of the pilot's blacking out. When the film from this make-believe battle was developed, it was found that the slow* Camel *had scored a decisive victory over the* Hurricane. *This is probably what proportionately happened in the battle between the slower* Mustang *and the faster jet MIG-15's. Add to that, one other very important score . . . the American pilot has proved himself to be a much smarter and ingenious pilot in flying and fighting than the enemy pilot. You just can't beat our American airmen on the ground or in the air, for courage, daring, good sense and judgment.*—ED.

B-25 Not B-45

Gentlemen:
I would like to call your attention to an error in the December, 1950, issue which we just received here at Buttonwood, England. To illustrate the article "Aerial Triple-Threaters," you have a photo of a Martin XB-48 and a photo of what you call a B-45. Actually, that plane looks to me like a World War II B-25.

SGT. J. F. GIBSON

APO 124
c/o Postmaster
New York, N. Y.

You are very right, Sgt. Gibson. The caption writer's finger got stuck on "4" which is just under the "5" on his typewriter . . . a strange attraction there, I guess. Anyway, you are right. The plane is a B-25 and NOT a B-45.—ED.

Jet Idents

Gentlemen:
Might I suggest that you feature a special issue devoted to the identification of all military jet planes in flight in the U.S.? I've looked forward to your past issues that featured the planes of the U.S. Air Force and the U.S. Navy and thought surely you would feature three-views of each ship. With jets roaring over now, there is a need for a source to refer to in order to identify what you see.

ART KEELEY

Peekskill, N. Y.

Your suggestion noted. Wilco.—ED.

Fleet's Out

Gentlemen:
You stated in "Air Your Views" that you got your license in a 165-hp Kinner-powered Fleet biplane. I've seen and flown many a Fleet and have never seen one with a 165 in its nose. Wasn't it a 125?

LT. (JG) J. B. WITKIN

USS Des Moines
FPO, New York, N. Y.

Guess that Fleet, like the fish that got away, keeps getting bigger as the years go by. Checked my log and found you absolutely right. It was a Warner 125. But she did wind up nice in a spin . . . didn't she?—Deflated ED.

Cub?

Gentlemen:
The plane in upper corner page 19 of the February issue does not appear to me to be a Cub.

B. GENGLE

Hartington, Neb.

Use of the name "Cub" was in reference to a lightplanes used by military, not specifically Piper Cub.—ED.

Where to go

Gentlemen:
I am writing in reference to testing facilities. have developed a new type of propeller for light-anes which is still in the invention stage. Fur-ermore, because of a lack of funds, I am being rced to give up my experiments. I have been tively following the development of aviation nce 1929 and understand the mechanics and eory of aerodynamics. I have subjected my prop various tests, but need more elaborate testing rounds now. Have you any suggestions?

RENE CHARETTE
ttawa, Ontario, Canada

Our only suggestion is that you contact some rop manufacturer, and if he decides your idea r a new prop has merit, join forces with him r the benefit of both of you.—ED.

oss Sportplane

Gentlemen:
You can tell your reader in your Air Your iews column in February issue that the one and ly Ross *Sportplane* is no longer in existence. was demolished in a windstorm on November , 1950, at Fitzmaurice Field, Long Island, N. Y.

FRANK STRNAD
orthport, L.I., N.Y.

Thanks, Mr. Strnad, for that information. We, o, have wondered whatever became of the portplane, and are sorry to hear it met such an d.—ED.

formation, Please

Gentlemen:
I am a firm believer in SKYWAYS and never ss an issue. Any pilot or would-be "fly-boy" n gain a valuable air education simply by fol-wing and studying carefully the subjects cov-ed in your magazine. I also enjoy your X-C ports. The info found in them has saved me ne and money. Now for a few questions:

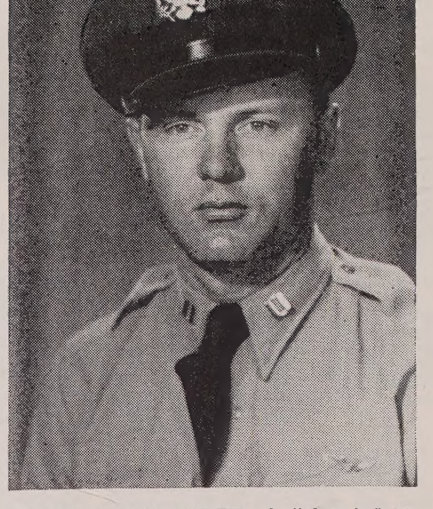
1. Is it possible to buy war-surplus fighter-pe planes direct from the government, or must find a private party who wishes to sell, and hat is an average price to pay for one, say an 51 or F-63 type in fairly decent shape?
2. If it is possible to get such a plane, what anges would have to be made to comply with AA?
3. Does the government still hold surplus air-aft auctions. If so, how can I get an invitation?
4. Is it possible to get back-dated, volume-und copies of SKYWAYS from the years 1941 rough 1947?
5. What would all-out war do to private avia-n in the U.S.? Would it ground all civilian craft for the duration?
6. I've been asked to ask you to publish a list commonly used aviation terms, such as VFR, IF, RON, etc., with definitions.

If any reader is interested in learning of the nditions of tourist travel and private flying in nch Oceania, he can write me and I'll gladly pply that information.

R. S. McCLELLAN
peete, Tahiti

Enjoyed your letter, Mr. McClellan, and thanks writing us. You pose some good questions. ighter-type aircraft are very expensive for the rage pilot to operate. There are, of course, ne in the hands of private individuals, but st of those sold to individual pilots were air racing and not for a strictly spare-time asure use. When a man invests in such a ne, there has to be some monetary return to et the original expenditure and to keep up ch ye ole up-keep—unless, of course, the pilot ppens to be well loaded with that folding green ff called money. To our knowledge there are fighter-type planes available today to private dividuals, either from the government or from private party. If you like to try for one yway, we'd suggest you write to The Babb Com-ny, Inc., 1007 Airway, Grand Central Airport, ndale 1, California. Another source might be abrose Aviation Co., 34-17 Lawrence St., Flush-, L. I., N. Y. Both of these companies have ex-t licenses. If you were able to buy direct from government, you would have to get an export nse before you could have the fighter plane ivered to you there in Tahiti. By buying from of the two companies mentioned above, the port license business would be automatically en care of. Too, the fighter plane you'd be wing would already have been modified to com-with what CAA requirements there might be. is possible to get those back issues of SKY-AYS. However, they would have to be purchased individual copies and they would not be vol-e-bound. That'd be something you'd have to do. copies are available at 35 cents each. As to at an all-out war would do to private aviation unknown in detail at the present. Private opin-is that it would be restricted to a great de-e in certain localities, and fuel might be on ation basis which in itself would restrict pri-e flying. However, we do not believe that all ilian aircraft would be grounded for the dura-. Wilco on the aviation term.—ED.

CREW on ill-fated ship included Capt. Barry, Lts. Whitfield, Darrah, Sgts. Ford, Stephens, Thrasher, Lt. Gerhart



PLANE COMMANDER of ill-fated B-36 was Captain Harold L. Barry, USAF

The bail-out bell jangled . . . and one by one, 17 airmen left the '36

Hell Comes To a B-36

WELCOME BACK—Crewmen rescued and returned to Carswell AFB *(below)* are greeted by friends and relatives

USAF B-36—When three of big ship's engines caught fire on flight from Alaska, 17 men had to hit the silk

By TERRY KAY

The B-36's airplane commander broke into a cold sweat as he watched the superbomber's No. 1 engine burst into flames. The six-motored aircraft's intercom phone crackled to life.

"Feather No. 1," he called into the plane's interphone.

Moments later No. 2 engine sent sparks and flames streaming into the black night.

"Feather No. 2 engine."

Somewhere off the west Canadian coast the U. S.

Air Force's latest bomber, on a routine training flight from Alaska to Fort Worth, Texas, was in dire trouble. Like the voice of doom, the startled crew members next heard:

"Feather No. 5—prepare to abandon ship."

Three of its six engines ablaze, the air giant lost altitude, dipped toward the black ocean below.

"Plane commander to radar operator," said Capt. Harold L. Barry. The aircraft commander's voice was cool, business-like. "Give me a heading to the nearest land."

Describing an arc the nose of the world's biggest bomber pointed toward an island.

"Radar operator to airplane commander. Princess Royal Island dead ahead. Highest elevation 3500 feet—general elevation, 1,000."

"Plane commander to radar operator. Tell me when we are well over the island."

"Radar operator to plane commander. Princess Royal Island, directly below."

bed the parachute pack. Then he felt the open flaps and the chute's shroud lines paying out. Instinctively, he pulled back his hand to keep from fouling the lines. After an eternity, the chute opened.

Dampness against his face made the airman realize for the first time that it was raining—and how he was to curse that rain. High winds swung him pendulum-like. If he hit the mountains at the top of a swing, he'd be a goner. Gerhart grabbed the two back risers and slipped his chute, easing its swinging.

Looking below, the parachutist saw dark and light spots. He sighed in relief, at least he was over land. Tree branches whipped against his legs and side, then he came to a halt dangling from a tree, but his feet touched snow.

Gerhart opened one parachute harness strap. Unable to open the other, he cut it with his knife and dropped into three or four feet of soft snow. He pulled his parachute out of the tree.

HOME of the B-36 lost off Princess Royal Island was Carswell AFB, Fort Worth, Texas. The giant bomber was enroute to home base from Alaska when three of its six engines caught fire high over the ocean and crew bailed out into the night

The great ship shuddered in its death throes. To crew members tensed at the doomed plane's open escape hatches, came the airplane commander's laconic, "Bail out." The bail-out bell jangled. One by one, the 17 airmen dropped into the unknown night.

No fears or thoughts passed through radar operator Lieutenant Paul Gerhart's mind as, falling earthward, he shot beneath the dying ship's wing. Sparks from the ill-fated air monster's No. 2 engine struck his face.

Realizing the plane was low when he bailed out and that there were mountains 3500 feet high on the island below, the airman quickly pulled his ripcord. Nothing happened. Frantically, Gerhart grab-

Gerhart had a cigarette lighter, some matches, four candles, a can of lighter fluid, a knife, about 40 rounds of ammunition, a 45 Savage automatic, an extra pair of gloves, a compass, all of his heavy arctic clothing, and a pair of dry Eskimo mukluks.

An outcry filled the night. The radar operator answered, and heard more shouting from other directions. He grinned, happy that so many of his buddies had landed safely.

Lighting a candle, the airman found he was on a snow-covered hillside. He called to the other crew member to stay put. Bundling up his chute, he crunched down the hill, stumbling every three or four steps as the deep (*Continued on page 41*)

MILITARY AVIATION requirements have expanded tremendously, creating large backlogs in available aviation industry productive capacity. Present-day civil requirements amount to less than 5 per cent of the military

Civil Air and

BEFORE going into the subject of civil aviation and national defense, I'd like to advise readers against expecting a blueprint or time-table of exactly what's going to happen to civil aviation in the next year. There are so many "if's" in the world situation which could change the picture entirely, that I would be rash indeed to attempt any firm long-range predictions. What I can do, and I believe it may offer you some guidance, is to outline the directions in which we are working now, the goals we are seeking and the assumptions on which our present thinking is based.

While I do not take a completely pessimistic attitude on the cold war ending, it is my duty as a government official to make plans on the basis of the facts as they exist, taking into account the unpleasant possibility that international relations could get worse instead of better. The CAA, therefore, is developing its programs so that it will work in the present period of limited mobilization, but with provisions always in readiness for an all-out emergency.

We have a two-fold objective. We seek for civil aviation the opportunity to make a maximum contribution to national defense, with a minimum of dislocation and restrictions on the industry. Inevitably, there must be occasions when we will have to make sacrifices but I know we will all make them gladly as long as we understand why they are necessary, and can see how they contribute to national welfare.

TOP BOSS of the CAA is Donald W. Nyrop

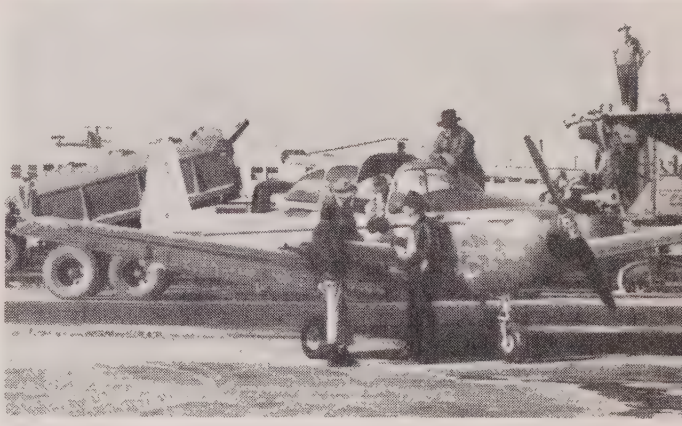
DEFENSE DEPARTMENT spokesmen have indicated their belief in the importance of keeping our air carriers operating

Defense measures are, of course, the joint product of many government agencies. I promise you, however, that insofar as CAA is involved, I will make every effort to obtain a clear understanding with industry representatives on the "why" and "how" of any steps affecting civil aviation which we may take.

Defense planning is permeating the entire CAA operation. The aspect which I know most concerns you is what we are doing to assure the continued availability of essential civil aviation supplies.

Civil aviation is only one cog in our gigantic national production machine, and cannot operate independently. Its aircraft and parts requirements are less than 5 per cent of the total dollar volume of military and civil orders. Within the structure and tempo of the whole production machinery, however, CAA can and is taking vigorous measures to assure due recognition for civil aviation needs, and establishment of clear-cut channels for satisfying the industry's legitimate requirements.

As you know, the National Production Authority has been established in the Department of Com-



PLANE OPERATION essential to business is not expected to suffer from emergency-imposed restrictions

National Defense

Interim program set up to keep civil air supplies available despite urgent U. S. military requirements

merce to see to it that defense and other requirements for materials and commodities are met. The NPA has a tremendous job to do. Every industry is hammering on the NPA's door, seeking solutions of problems which, to it, are all-important. Having experienced the same sort of thing within the more limited scope of one industry, I sympathize with General Harrison, the Administrator of NPA.

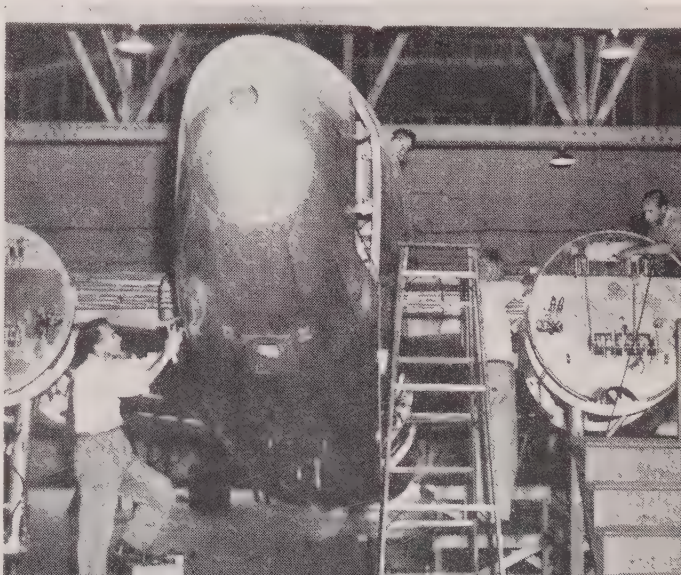
Therefore, the CAA has tried to come to NPA with a positive, helpful approach. Because of its relation to U. S. civil aviation, the CAA has been designated by the Secretary of Commerce to do the job of screening for NPA civil aviation claims for parts, materials, and in fact, all aviation products other than new civil transports on which the CAB is in a better position to speak. In addition, we have assigned to NPA for as long as they need him a member of our planning staff who had valuable experience with the War Production Board.

Defense Department spokesmen already have indicated their wholehearted belief in the importance of keeping the air carriers operating, to the extent that they are willing to (*Continued on page 48*)

By Donald A. Nyrop

Administrator of Civil Aeronautics

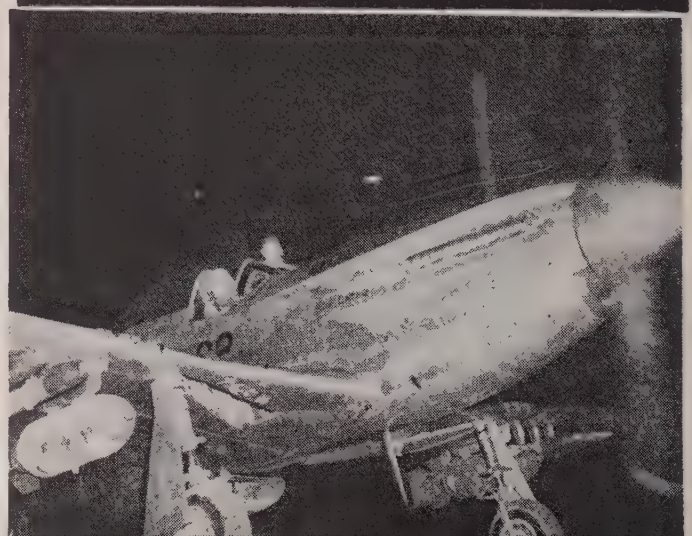
EQUIPMENT, PARTS necessary to maintenance of business aircraft will be available via NPA program



PARACHUTES blossom over Korea as U.S. combat cargo planes, in this case Fairchild *Packets*, drop about 80,000 pounds of ammunition and supplies to hard-pressed infantrymen in bitter struggle against the Chinese Reds

SPOTTING PLANE that was "rescued" from the Hungnam Beachhead is unloaded from LST after evacuation. Mid-night mission finds Capt. Wm. Hook *(right)* in cockpit of an F-51 *Mustang* before attack on a Communist convoy

Air War in Korea



MARINE fighter-pilot taxies his *Corsair* into catapult for launching from carrier off Korean shore. Kimpo Air Field *(below)* was once held by U.N. troops. This photo was one of last taken of AF operations

RUSSIAN MIG-15'S like this one *(above)*, have been engaging USAF and Air Navy planes over Korea. Performance of the MIG-15 is said to compare with AF F-86. However, our F-86's *(below)* have won all air battles with Red MIG-15's

PIPER TRI-PACER is the newest of the Piper Aircraft line. Basically the *Tri-Pacer* is the four-place *Pacer* with a tricycle landing gear. Another feature of the 1951 Pipers is shoulder straps (*left*). These are optional, but are available for all Piper models

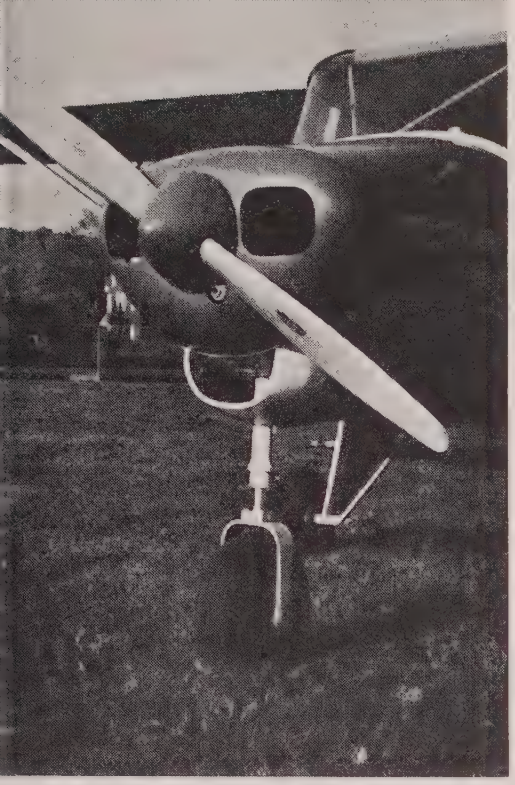
Pilot's Report...New Tricycle-Gear Cub

By L. M. HORTON

ADD another "Cub" to the Piper family . . . and this is one many a pilot has wanted to see for a long time. On our most recent trip to Lock Haven, Pennsylvania, home of the *Cub* family, we arrived in time to see the first of the new 1951 Piper products take to the air—a tricycle-gear *Pacer*, the four-placer in the Piper stall.

The *Tri-Pacer*, or PA-22 (1951 *Pacer* is designated PA-20 "125" or "135," depending on prop), is the Piper plane with the "big-ship" look. Piper has set the wheels of the main gear back of the CG and 12 inches further apart. If you were to measure the area from the nose wheel to the center of an imaginary axle between the main-gear wheels, you'd find it the same as that of the *Navion*. The *Tri-Pacer's* nose wheel is a husky, beefed-up job with an 8-inch stroke oleo strut. The strong flexible yoke is a flat sheet of formed duraluminum, and the main gear is Hydra-sorbed. Tires are 6:00 x 6.

Over the years we've found ourselves saying, ". . . we climbed into the cockpit," ". . . hopped in," ". . . jumped in," or some similar expression to describe the not-too-graceful art of getting into an airplane. But there's no more



NOSE WHEEL on the new *Tri-Pacer* is a beefed-up job with an 8-inch stroke oleo strut. All three tires on *Tri-Pacer* are 6:00 x 6

of that with the *Tri-Pacer*. You simply step on the tire and into the cabin . . . it's as easy as getting into your own car. That sit-level-on-the-ground attitude of the *Tri-Pacer* will have passenger appeal aplenty.

For the pilot, the extra visibility afforded by the tricycle gear will head a long list of operation advantages.

Taxiing with the tri-gear is a very pleasant and easy maneuver. You can use your wheel to make wide-arc turns, or your rudder for sharp on-the-spot swing-arounds. And for parking, the combination is perfect. As an "extra," the way the tricycle gear smooths out an otherwise rough field is a feature of both pilot and passenger importance.

For our test hop, we took off straight down the runway (you can't miss), came back on the yoke a little at 55 or 60 mph to lift the nose wheel, and were off and in our climb in a matter of seconds. Although the new gear adds about 20 pounds, it knocks nothing off your climb and nothing off your cruise. We climbed out of the field at a good 85 fpm on 2400 rpm and then cruised an easy 132 mph at 5,000 feet on 24 inches of manifold pressure. This *Tri-Pacer* was the "135" (same as the "125" except that it is equipped with Sensenich controllable-pitch prop instead of the slow-turning fixed-pitch Sensenich prop).

One of the noteworthy improvements in all the 1951 Piper models is the completely revised stabilizer actuating mechanism which gives more positive control. In the *Tri-Pacer* you also have a tie-in between aileron and rudder for directional and lateral stability. This linkage permits either a three- or two-control type of landing.

We made our first landing in the conventional manner: coordinating the controls, setting down on the main gear, then easing forward on the nose wheel. It touched down at about 50 mph and rolled to an easy stop in something under 400 feet.

With the engineers' okay, we (*Continued on page 50*)

TRI-GEAR of the new *Pacer* and its sit-level-on-the-ground attitude makes easy cabin entry

SUPER CUB powered by 125-hp lycoming engine offers a jack-rabbit take-off. Test *Super Cub* was up and away in 60 feet

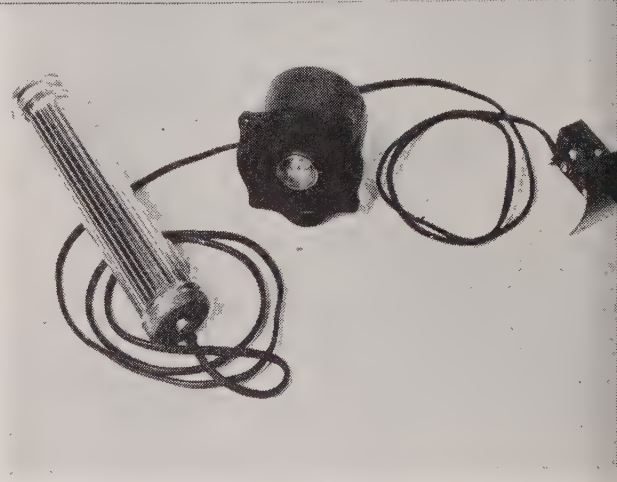
CAA begins re-education program to teach new stall-recovery technique

By V. A. PREVETTE

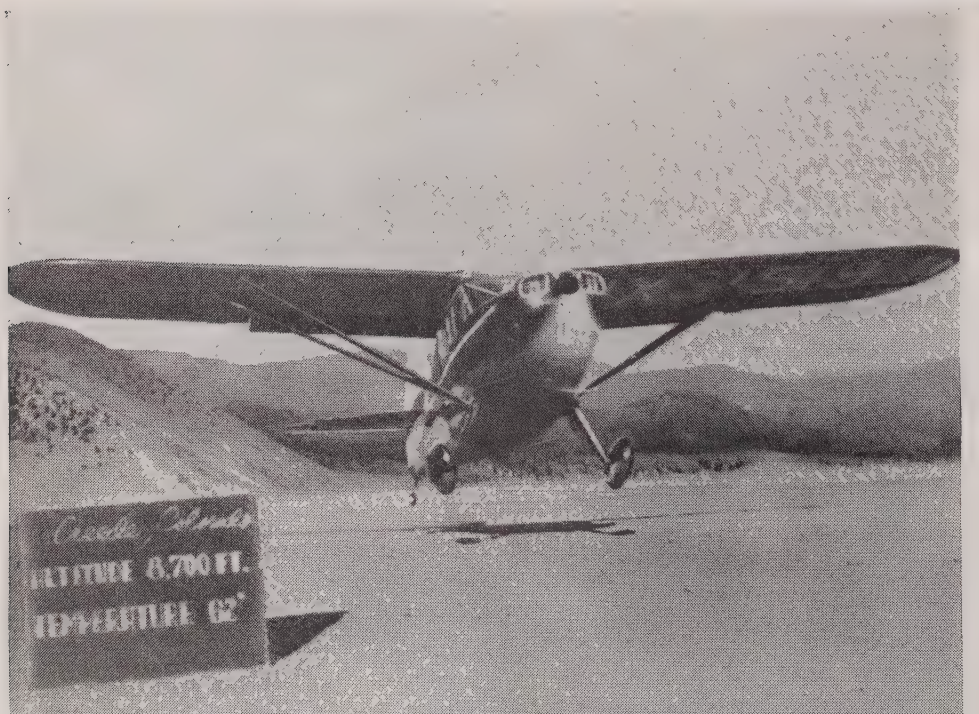
"On Horizon" and "Below Path" are words that are going to be heard frequently in the future. They mean stall safety! The CAA, in a drastic change in their recommendation on stall-recovery technique, is stepping out on a sweeping program of re-education of, first, CAA agents, then pilots, instructors and flight examiners, all over the country.

A specially equipped plane is now on tour in the central states to show hundreds of pilots how to cut down their loss of altitude when recovering from a stall—and that loss by *almost two-thirds!* In spite of every effort being made to reduce the alarming and persistent train of stall accidents they have decreased but slightly, continuing to result in injury, damage to aircraft and fatalities. At last, it seems that both experienced pilots and students are to be re-trained to a more practical stall-recovery method. The statement, "Stalls at low altitudes cause the most accidents" may not be true in the very near future if the exciting findings of a couple of research men are wisely used.

The research itself was exciting. The work was done by the Committee on Aviation Psychology of the National Research Council with funds provided by the Civil Aeronautics Administration. Dr. P. J. Rulon was the dynamo of the outfit. In fact, the study was based on data discovered in his two earlier reports on pilot (*Continued on page* 40)



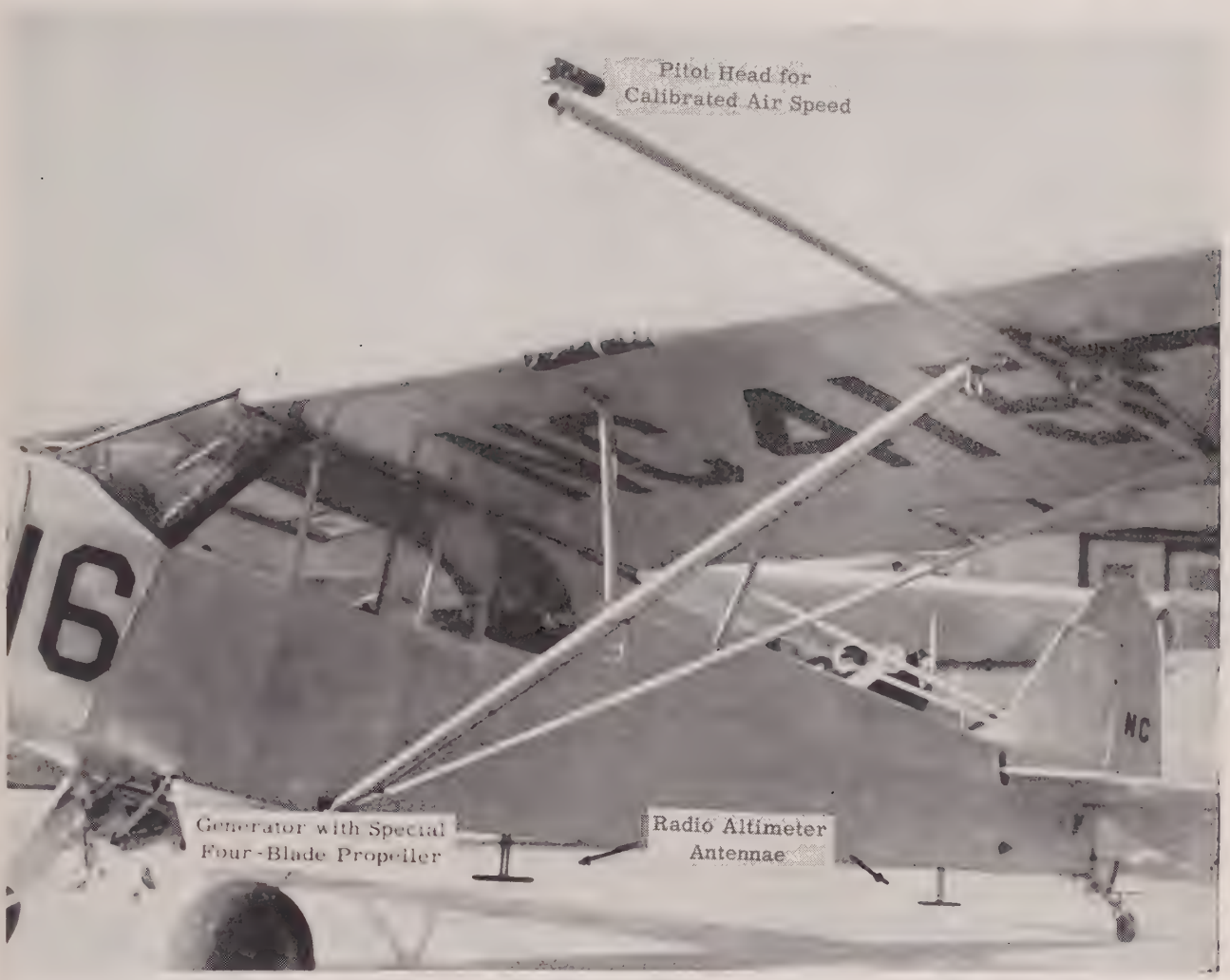
STALL-WARNING indicator (*above*) lights up, blows horn, does everything but squirt water in pilot's eye to warn him of proximity to stall. Tests have proved most pilots cannot detect an approaching stall without an indicator



STALL accidents often occur during landing. Leveling off too high accounts for many a damaged landing gear. Stall-warning indicator warns pilot that plane is about to let go in time for him to prevent a plane's dropping in and possibly causing injury to himself as well as passengers

TAKE-OFFS made at critical altitudes, on short fields over obstacles and under critical wind conditions, etc., can be made with less worry or concern if plane is equipped with stall-warning indicator and is adjusted so it can be used as maximum-climb-angle indicator. Note take-off here

Story of a Stall

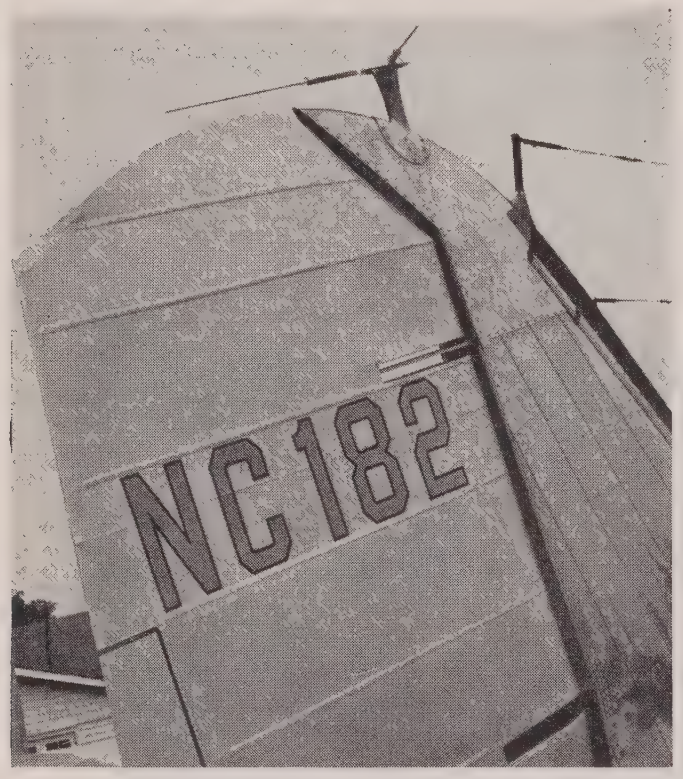


LIGHTPLANE especially equipped (*above*) is now on tour in central states to show pilots how to cut down loss of altitude when recovering from stall. Tests have proved most pilots cannot detect approaching stall without a stall-warning indicator. This plane promises to teach a lot

INSTRUMENT panel in the test plane looks like this. Note ammeter, engine instruments, helicopter airspeed indicator, angle-of-attack indicator, a sensitive altimeter and a radio altimeter (changed to a "double reading," *i.e.* if it reads 200 feet, the actual altitude is 400 feet)

Ridin' the Radio

Modern system of electronic aviga-tion guarantees all-weather flight



VEE ANTENNA mounted on the tail fin of this plane was developed at CAA Experimental Station for VHF radio use. Within a few years all radio will be VHF, the basis of modern development in all-weather electronic avigation

By J. HOLAHAN

Have you ever been lost while flying?

There's a stock answer to that question which goes like this: "I've never been lost but I have been badly confused for a couple of hours." Being confused in the air is dangerous while being lost is year after year one of the chief causes of fatal air accidents. No pilot who has ever been "confused" in bad weather and forced to utilize the low frequency four-course range to orientate himself, will vouch for the adequacy of our present radio navigational system. If you have ever been up there in the soup, low on gas, milling around, trying to identify your location on a range whose signals are mixed to an almost unidentifiable level with static and all sorts of gibberish, you will, regardless of the cockpit temperature, be covered with a clammy sweat much worse than the one you experienced on your CAA instrument check or your first ride in a Link. This is no check. You can't throw back your blind flying hood or remove your colored glasses and gaze into a CAVU sky. Neither is your aircraft bolted to a concrete floor.

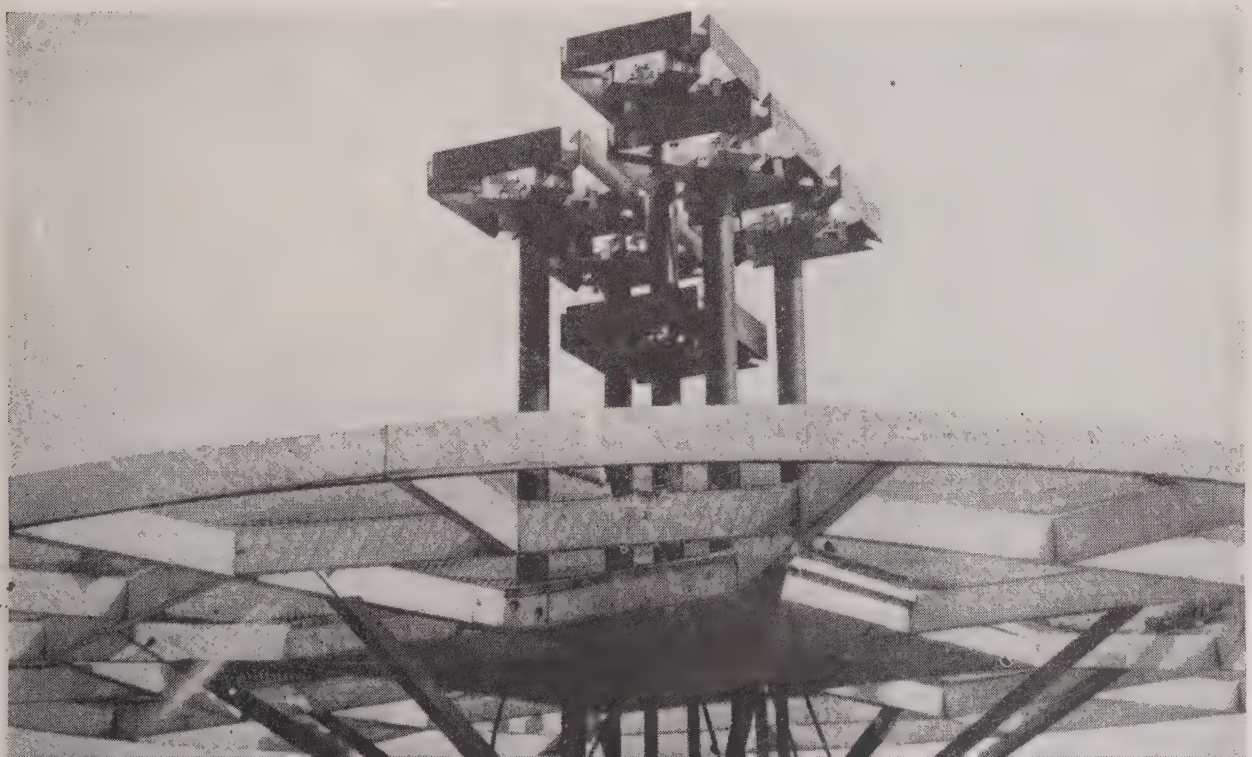
When you've finished berating yourself for not keeping up your instrument technique, you will un-

OMNIRANGE antennas are enclosed in a non-metallic shelter atop a 15-foot tower. This one's at Black Moshannon, Pa.

RCTA SYSTEM of electronic avigation possesses airline accuracy, but is simple enough for private-pilot use in personal planes

doubtedly use the old stand-by true-fade system to reveal your heading with respect to the range station. Under conditions of poor reception this is the ultimate of the difficult. If by chance you happen to be far out in the quadrant, the variation is so gradual that it requires a good deal of time to satisfactorily determine whether you are in or outbound. Of course, if this particular range happened to have a multiple or two, or perhaps a couple of strong A's in the midst of an N quadrant, or a bent beam or false cone, it really could be confusing—even disastrous. Let's assume you managed to solve this complex problem of orientation, hit the high cone and break out into the clear. On your let-down you would undoubtedly thank all the good angels that guide man-made wings, meanwhile promising them you would forever be an ardent student in the mysterious art of instrument flight. Perhaps you would even buy an ADF (but even ADF's go screwy in an electrical storm). However, not too many of us would blame our system of aerial navigation for our dilemma. We might think that it left much to be desired but we have learned to accept the system with (*Continued on page 45*)

FIVE ANTENNAS, shown here outside their non-metallic shelter, are arranged four in a square with fifth in the center



CARGO LINER coming into Wake Island has part of runway off left wing. Island is wholly governed by the CAA

CAA's Own Little Island

By DON DOWNIE

WAKE ISLAND: This tiny atoll is famous for three things. It was the first real battlefield of World War II. President Truman met General McArthur here last October. And it is wholly governed by the Civil Aeronautics Administration.

CAA control of this little island is similar to the organization of Canton Island, except that the British control half of Canton and the U. S. controls the other half. At this writing, the island of Wake is entirely under civilian control. One scheduled and one "non-sked" have revocable permits from the CAA to operate on the island. Pan American Airlines maintains a hotel and crew housing units near the control tower while TransOcean Airlines has a series of Quonset huts and a 24-hour-a-day mess hall at the other end of the airport.

During the historic Pacific Airlift, little Wake Island has been a busy place. Normal pre-Korea traffic at the passenger terminal and gas pump averaged four or five transport planes daily. At the peak of the airlift, 30 to 40 DC-4's and Boeing *Stratocruisers* touched down on the 8400-foot air-

WAKE was first real battlefield in Pacific W.W. II. Today planes go north to Japan, west to Philippines from Wake

port. Conditions were so crowded that additional parking area had to be bulldozed out near the gas pits.

Flight crews returning to their airplanes after a quick meal would ask, "Where's my airplane?" The flight dispatcher would point casually out into the night. "It's a down there in the boon-docks somewhere. I'll get a jeep and help you find it."

A token landing fee is charged for all transient planes. A DC-4, for instance, must pay $11.36 while a Boeing *Stratocruiser* is charged $22.75. Transport planes that remain on the ground over six hours are charged 2½ cents per thousand pounds as a parking fee.

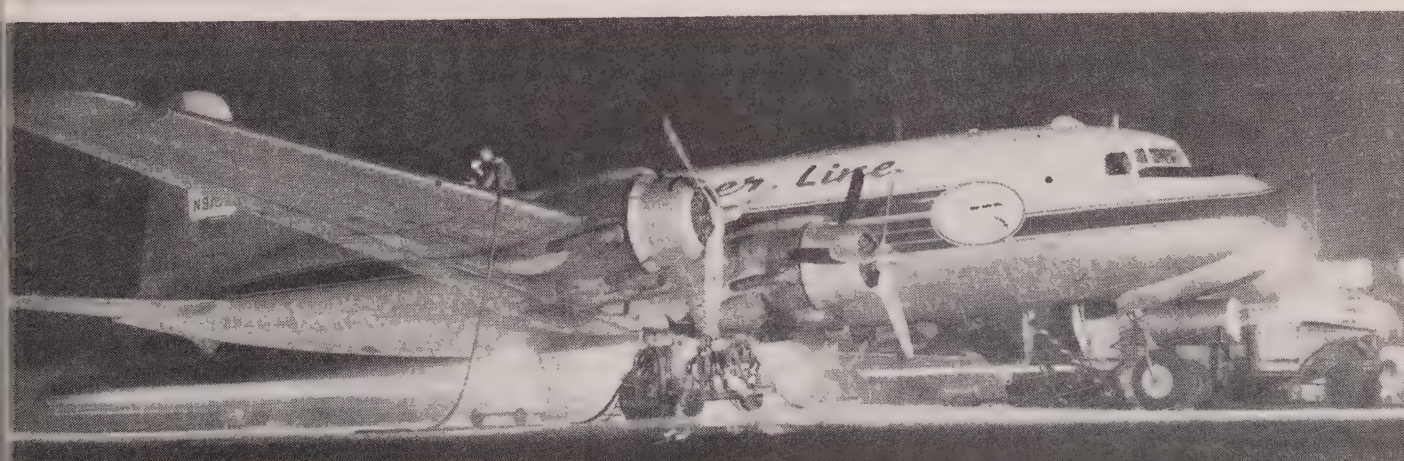
While the control tower here had been built for months, traffic was normally so infrequent that no actual equipment had ever been installed. When the rush of the airlift began, however, the CAA had a complete tower installation working in just two weeks. Tower operators as well as other CAA personnel rotate with the staff assigned to the Hawaiian Islands.

The Wake Tower has a three-fold job. It handles air route control, approach control and regular airport traffic. There's no instrument approach into this little atoll. When a tropical thunderstorm is unloading its moisture directly over the airport, traffic holds 10 or 15 miles away until the storm passes by. The heavy rains never last over 15 or 20 minutes and the annual rainfall is 39 inches.

The CAA's head man here is T. D. Musson, a former Naval officer and once a radio writer and producer for station WHAS in Louisville, Ky. By count, he has 15 different (*Continued on page 35*)

SKYWAYS' reporter Downie sits atop a Jap tank, a grim reminder of the Japanese attack on Wake back in 1941

WORLD WAR II wreckage still very much in evidence on Wake includes the hulk (*left*) of *Suwa Maru*, a luxury liner run aground by its Jap skipper. Cargo liner (*below*) goes into Wake for refueling, will then be off to Japan



COMPANY PLANE owned by Mountain Tractor Co., flew V. Howell *(left)* and G. Martin into Libby, Montana. Trip took 30 minutes; by car it would have taken three hours over rough mountain roads—tiresome driving

KAY-BRUNNER Steel Products flew company *Navion* to Logging Congress at Chico, Calif. More interest was displayed in the *Navion* than in the logging equipment on show. First Kay-Brunner ship was Culver V

Company Plane Pays

HAS your company thought of owning an airplane? Have you considered the cost of fast, personal transportation? Have you considered the dividends possible from being able to schedule your own air freighter or company-owned small airliner?

These questions were asked by the powers that be in our company, Kay-Brunner Steel Products, Inc., and a small two-place plane was first put to the test. As with many organizations, the last war planted a seed in the minds of our management regarding the air power which played such a large part in final victory. Our executives were willing to consider the possibility of utilizing a plane in our business to save time in transportation of personnel. This would make it possible to cover more territory saleswise and be able to offer better service when the occasion demanded in supplying replacement parts. The part an airplane

AIRPORT used by J. Neils Lumber Mill at Libby, Montana is 2,020 feet long. To get in, calls for 8500 feet altitude

By J. F. BRUNNER, JR.

might play in a public relations aspect was also carefully considered.

At the outset, it was decided the only way we could get the right answers to many of our questions was to actually fly a small inexpensive plane in our business for a long enough period of time to get sufficient experience to properly evaluate all costs—hidden and obvious.

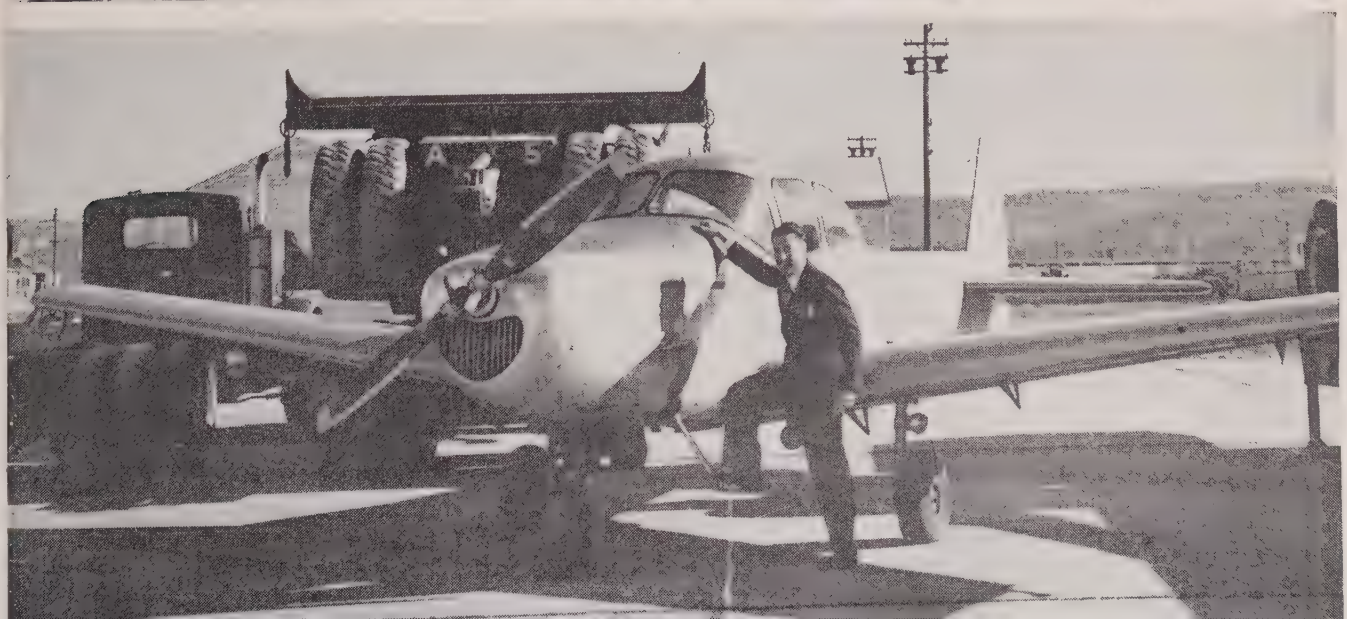
Consequently, in November 1946, we purchased a used two-place Culver V, and began our operations. The airplane only had 25 hours on it when it was purchased so, for all practical purposes, it was a new one. We flew the Culver 200 hours in the one year we had it, and reached these conclusions:

1. Sales territories could be enlarged about twofold.

2. Key production men could be taken on service calls as they were not away from our manufacturing plant as long as had been the case when we were using other means of transportation. Generally, these higher skilled men could overcome trouble quicker and did a better (*Continued on page 43*)

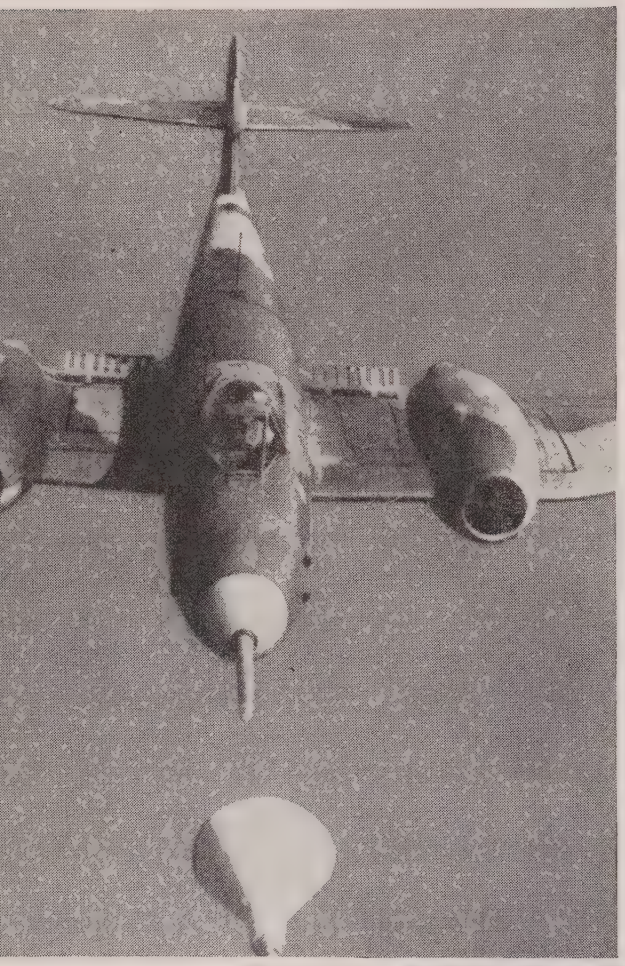
LANDING FIELD used by Mountain Tractor Co. *Navion* is rough and rocky strip less than 2,000 feet long. The *Navion* gets in easily despite field's altitude, its high mountainous surroundings, rough surface

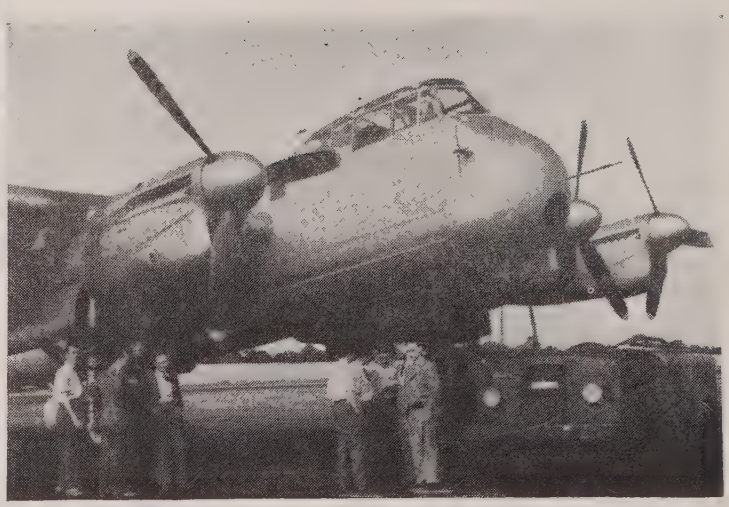
PILOT of Kay-Brunner airplane is J. F. Brunner, Jr. Before his company bought plane, a used two-place Culver was tried out. After 200 hours of use in a year, proof of the plane's value was apparent to owners



Refuel In Air

By HERMANN SCHOENEN





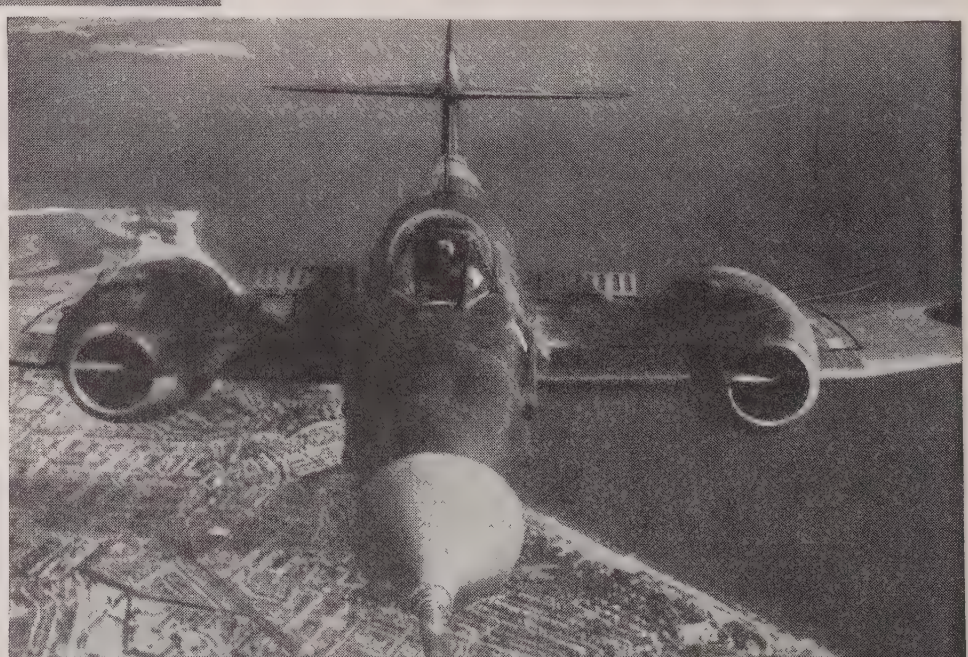
TANKER used in air-to-air refueling of Gloster *Meteor* was a *Lancaster* carrying 1,250 Imperial gallons of gas

British Meteor is refueled in air 10 times, stays aloft 12 hours 3 minutes

Several months ago a Boeing B-50 bomber, better known as "The Lucky Lady," made a record flight around the world by taking advantage of refueling in the air. For this purpose the equipment and technique evolved by Flight Refuelling Ltd. of England were utilized. Although Flight Refuelling Ltd. is by no means a new company, having been in business for over 15 years, this was the first time its operation had attracted world-wide attention.

Near the end of 1950 another record was broken, but this time it did not involve the refueling of an aircraft equipped with standard reciprocating engines. Instead, a Gloster *Meteor*, one of the fastest

CREWMAN sitting in aft of *Lancaster* sees the *Meteor* and its pilot this way during air-to-air refueling operation



HOSE 65 feet long trails from fuselage of *Lancaster*, has cone at end facing aft. When hose is let out behind tanker, *Meteor* comes in from rear, uses half flaps, then "flies" probe on nose of *Meteor* into cone. Toggles inside cone grip probe tightly and keep it in proper position. Hose slack is taken up, then fuel is run from tanker through the hose into the *Meteor*. At end of operation, *Meteor* withdraws, all refueled. During refueling operation both planes flew at 190 mph. Fuel was transferred at a rate of better than 100 Imp. gallons per minute. Jet was up 12 hours

jet planes in the world, was refueled in the air.

The *Meteor* remained in the air for 12 hours and 3 minutes, covering about 3,600 miles, or from eight to nine times its normal range, without using drop-tanks. During this period its tanks were replenished 10 times and a total of 2,352 Imp. gallons of kerosene was transferred. The tanker itself, a converted Avro *Lancaster*, landed twice to be refueled.

PROBE fitted to nose of the *Meteor* is a five-foot rigid tube. Inner end connects refueling gallery

Since it was necessary to provide means for an almost instantaneous contact and since the pilot of the *Meteor* had no crew to assist him as on the B-50 bomber, an entirely new design of equipment had to be created. Simplicity and dependability were of the utmost importance. Therefore, many experiments had to be conducted and many trial flights had to be made before Sir Alan Cobham, Managing Director of Flight Refuelling Ltd. and his staff felt certain that this endurance flight could be successfully undertaken.

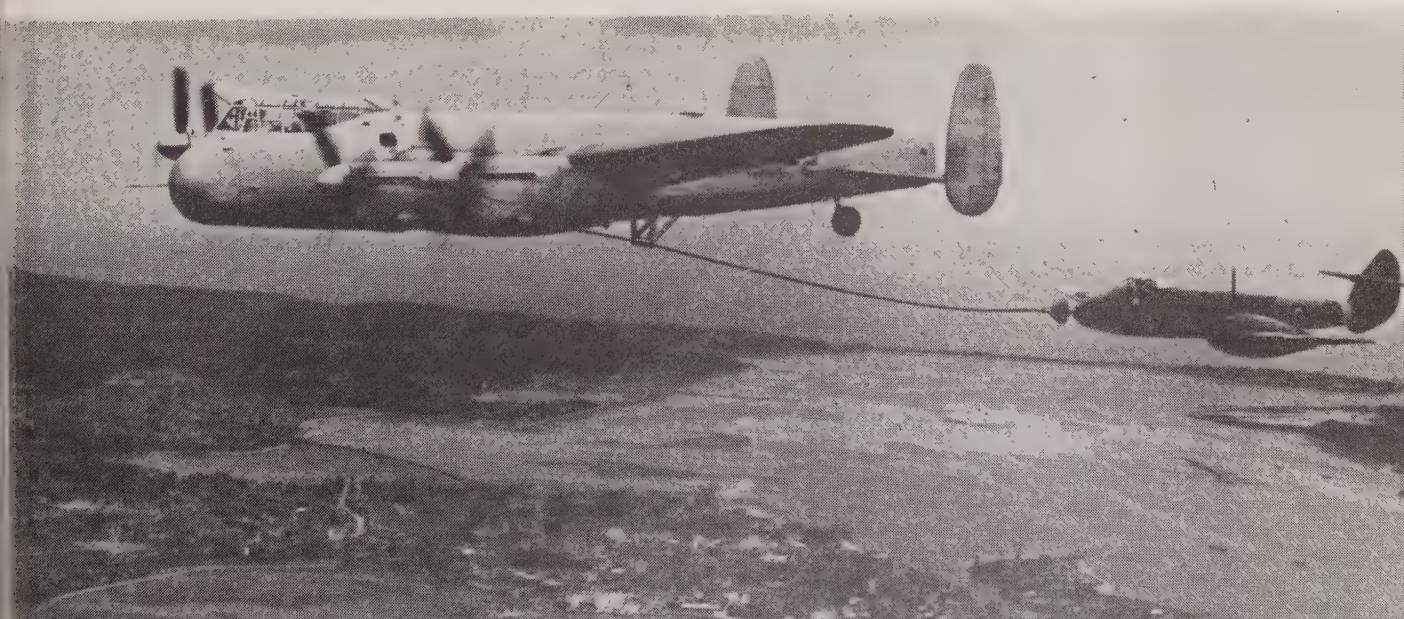
The equipment on the tanker as well as on the fighter were extremely simple, the equipment of the fighter weighing only about 25 pounds.

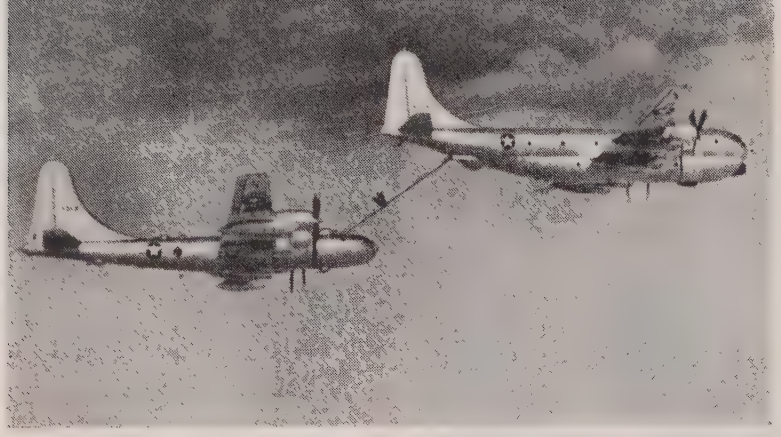
The tanker was fitted with a hose, about 65 feet long, which was trailed from the fuselage when the proper time for contact arrived. At the outer end of this hose was a hollow cone, the base of which faced aft, acting as a drogue. When not in use, the hose was stowed in the tanker on a spring-loaded drum and was connected by means of a revolving joint to the fuel supply of the tanker. At the time of test flight, this fuel supply consisted of one 1,250-Imp. gallon kerosene tank and five standard fuel booster pumps.

The equipment of the *Meteor* consisted of a rigid tube about five feet long, called the "probe," which protruded from the nose of the fuselage. The inner end of the probe was connected to the "refueling gallery" which fed the fuel tanks under normal pressure. The *Meteor* had two tanks with a total capacity of 325 Imp. gallons. Each tank was equipped with shut-off valves which controlled the flow of the fuel and shut it off when the tank was full.

At the beginning of the operation the fighter plane approached the tanker from behind, applied half flap, and assumed such a position that the probe entered the cone attached to the hose which was trailing the tanker. Then the fighter advanced a few feet, which had the effect of centralizing the cone on the probe and also of over-riding the air drag of the cone. Three toggles inside the cone gripped the probe tightly and kept it in its proper position. In the meantime slack in the hose was taken up in the tanker by the spring-loaded drum. In that position the cone was held tightly against the probe by the air drag. A mechanism in the center of the cone engaged a groove at the end of the probe, creating a leak-proof joint between the two, and kept it leak-proof up to a (*Continued on page 38*)

AIR PHOTO shows refueling of *Meteor* over Poole Harbour in England. This system of air-to-air refueling of the jet *Meteor* was developed and tested by Flight Refuelling Ltd. Tanker plane is a modified World War II *Lancaster*

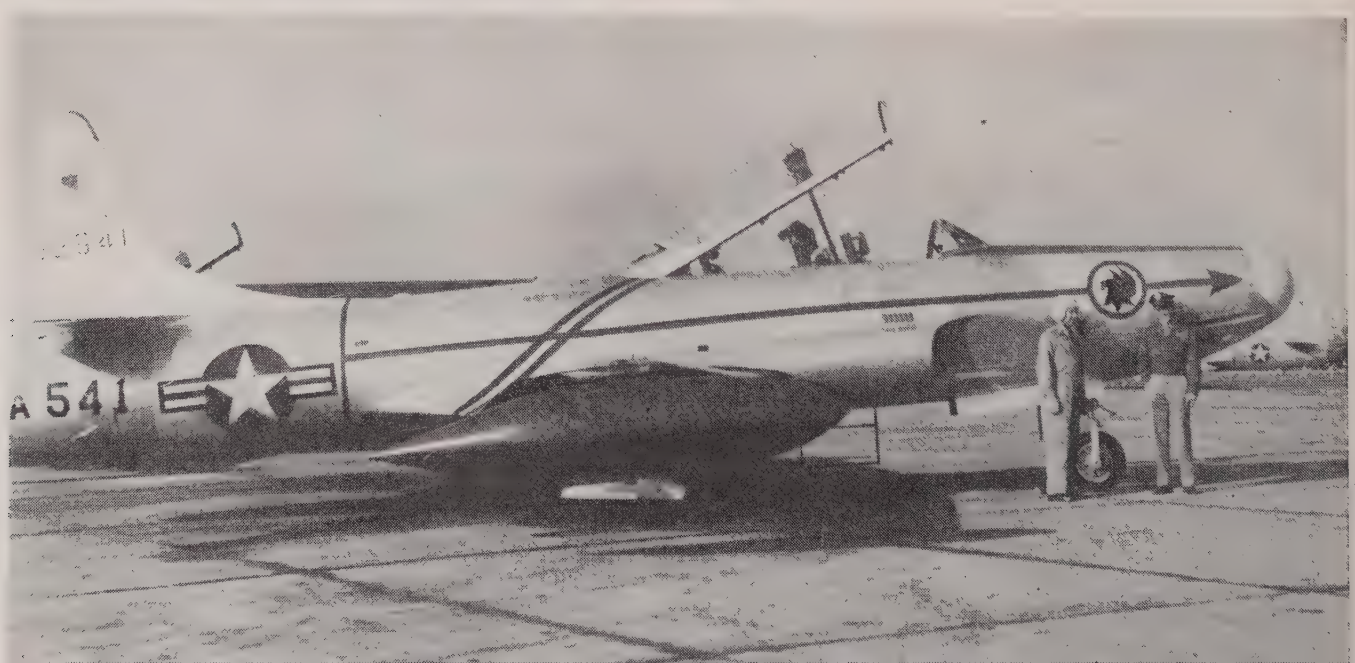




IN-AIR REFUELING—The new Boeing KC-97 *Stratofreighter (above, right)* tries out its new role as an aerial tanker by refueling an Air Force B-50 bomber in mid-air. The AF's new triple-threater, the KC-97 can carry up 68,000 pounds of freight, and can also transport 135 fully equipped combat troops or 83 litter patients with complete medical supplies, attendants.

BUSY BASE—Proof of the popularity of seaplane flying is this photo of Lavery's Seaplane Base at Round Lake, N. Y. One of the East's most active operations, a total of 14 seaplanes and amphibians are based here. Owner-operator Lew Lavery first set up operations in 1937. At that time his equipment consisted of a C-3 Aeronca on floats and a house trailer. Round Lake is located near Albany.

ALL-WEATHER WING—"Seek, Attack, Destroy" is the motto of the 52nd Fighter All-Weather Wing at McGuire AFB, N. J. In operational use by the pilots of the 52nd is the Lockheed F-94, the Air Force's latest radar-equipped jet fighters. The All-Weather Wing, a part of Eastern Air Defense Force, is on 24-hour standby alert. Wing Commander is Col. E. Beverly *(below, left)*; C.O. is Lt. Col. Preston.



NACA RF-61—Test ship for the National Advisory Committee for Aeronautics is this twin-engine World War II Northrop *Black Widow*. Shackled to underside of the RF-61 is a heavily weighted "body" on which is mounted a set of experimental wings. At 35,000 feet, the "body" will be dropped, instruments record performance.

JATO TAKE-OFF—Recently the first Fairchild C-119 *Packet* with JATO installation took to the air at Hagerstown (Md.) airport. On first trial run take-off with a 16-bottle installation *(left)*, the C-119 broke ground in 460 feet. Use of JATO on the *Packet* will further improve its utility for military operation by reducing ground-run.

SINGLE-ENGINE GET-AWAY—Also using JATO (jet-assisted take-off), this *Convair-Liner* belonging to Ethiopean Air Lines demonstrates single-engine take-off at San Diego, California. The Ethiopean airline was first to install JATO as standard equipment. The installation is a safety measure for high-altitude field operation.

CRASH...

AUTHOR-FLYER Dick Grace crashes planes for movie shots and as stunt for air shows around U.S.

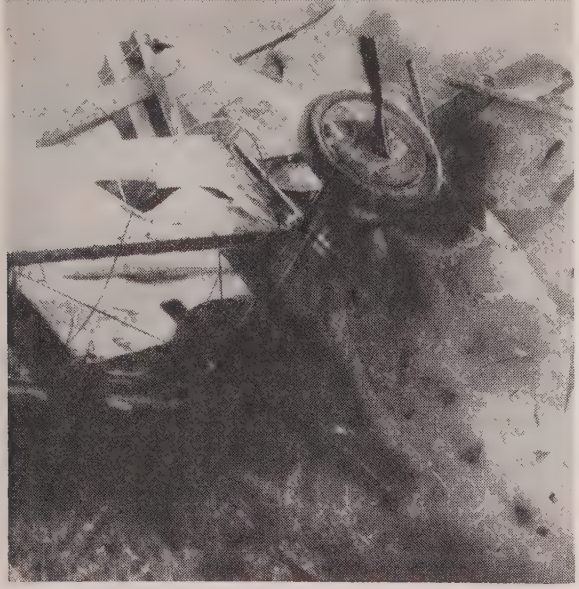
and Walk Away

By DICK GRACE

IF YOU are an efficient and conservative pilot, chances are you will never be in a crash. Offhand, I can think of but very few situations in which a pilot who knows his business has to destroy his ship or injure himself—outside of pilot error, of course.

There are probably many accidents that a pilot will blame equipment for, but pilot error will still be there—and usually is, whether a motor cuts out or not. There are exceptions, of course. Before analyzing these, let's consider a few—those which cost lives, but should seldom occur.

Examine your qualifications before making long-distance



MOTION PICTURE crack-up like this *Eaglerock* (*above and below*) for the movie "Young Eagles" is an aeronautical science to the stunt flyer who wants to stay alive to fly again for films

FOKKER D-7 (*below*) was crashed by Grace for the movie "Wings," World War I aviation film

CHEST BELT was designed by Dick Grace to help keep him from serious injury. Years of crash experience has taught Grace the lessons he passes on to pilots here

X-C's. If you are not an instrument pilot, if your equipment is not designed to fly weather, if you can't get along without your radio, if you cannot fly on your bank-and-turn, altimeter, and airspeed, you don't want to get hung up in weather and then decide you *must* fly through it.

Have you always placed the proper value on altitude?

Do you note emergency fields which your particular plane could get into—just in case?

Can you make a good short pattern and land in the first third?

If you strike a strong headwind and think you might just about make your destination, do you go blindly on, trying to stretch your gas?

Do you know *your* efficiency with a motor, not the manufacturer's, in computing gas consumption?

Have you personally checked your equipment, your gas and oil?

Do you recognize a change in air conditions before you're in it? Do you know fronts? Do you keep a close check on your ground speed?

Would you allow for the difference between a throttled motor landing (simulated forced landing) and a dead stick?

If you've gotten down safely in an emergency landing that could have been a crash, you've actually bridged only 50 per cent of the danger. If it was a tight squeeze getting in, remember it will be a tighter one getting out when the cause of the forced landing has been corrected and you're ready to fly again. Don't be ashamed to drop your passengers—no matter what the cost—and pick them up at the nearest field safe for all operations. Don't take chances with passengers. They rely on your judgment and if it's not good, you are responsible for their injury. Use every inch of the field—put on the brakes and use some flap, chew some air, then let loose. On these take-offs, allow for the difference in altitude between the home field and the emergency one you're using.

If in hot weather you are in doubt about the ability of the ship to make it, suspend take-off time until dawn or just before, when the air will be heavier and there is more support.

Of course, you will be careful of uphill, cross-wind take-offs, slow, muddy or sandy ground and obstructions, the altitude you must make (*Continued on page 36*)

FAREWELL, THE "JUG"

REPUBLIC F-84E, *Thunderjet*, has now replaced the F-47. This one (*above*) has just landed at the Neubiberg AFB

BOWING OUT of Air Force service, the sturdy Republic F-47 *Thunderbolt* zooms away to its place in "Hall of Fame"

NEUBIBERG AIR BASE—The *Thunderbolt* has struck and passed. The crash and clamor of battle, the shriek and the roar of straining wings and laboring engines, the bellowing chatter of concentrated fire power, these things for the Air Force *Thunderbolt* are gone. Gone, too, is the endless droning of a million hours of peacetime flying, a million hours with weary sameness broken only by bright, short interludes of periodic maneuvers, firing and bombing practice and fire-power demonstrations. All gone.

For the Republic F-47 *Thunderbolt*, known to those who loved it as the "Jug," sworn by and honored by countless Allied pilots the world over, has folded her battle-scarred old wings, taxied through the narrow, time-honored portals of aviation's "Hall of Fame," and settled herself in her rightful place beside the *Spad*, Fokker D-7, Messerschmidt, and *Spitfire*, as one of wartime's truly great airplanes.

THUNDERBOLT strikes. This photo of 86th Fighter-Bomber Wing F-47 was taken during last joint maneuvers in Germany

By SGT. S. E. TURNER

Special to Skyways

THUNDERJET is now in service in Germany with 527th Fighter Bomber Squadron of 86th Fighter-Bomber Wing at Neubiberg Air Force Base in Germany. The 527th Squadron was last AF unit to use the battle-famous Republic *Thunderbolt*

Final phases of the F-47's passing out of Air Force service were completed at the 86th Fighter-Bomber Wing shortly after the arrival of new Republic F-84E *Thunderjets*. A final flight of "Jugs," composed of the 527th Fighter-Bomber Squadron, rose wearily off the rubber-scarred airstrip and pointed their heavy, powerful noses toward the nearest Air Force Depot, where they are now in storage, awaiting future disposal.

The 527th, which was the last Air Force unit to employ the F-47, watched the famous old veteran go with many a fond memory and perhaps even a tear or two, for the plane was known by mechanics as "hell to work on, but worth it," and described by pilots as "a ship that will forgive your mistakes." Perhaps the two best-known of all the "Jug's" good points were its terrific concentration of fire power, plus its ability to bring its pilots back with one and two cylinders shot completely away.

The first model of the F-47, which is a direct descendant of the old Republic P-43, first went into action in the European Theater in the early part of 1943, and thereafter demands sent out by Air Commanders in all theaters were so great in number that by the end of the war, Republic Corporation had built for U. S. and Allied use more than 20,000 of the versatile fighter.

The plane's popularity with fighter pilots was instantaneous. Its rugged construction coupled with a rate of diving speed in excess of 600 mph, and a tremendous concentration of fire power, made it an overnight sensation on all fronts, the European Theater in particular.

Enemy armored convoys and ground troops in the field now had a foe to reckon with more dangerous than an attack bomber, and twice as destructive to men and equipment.

At the first appearances of the plane over Germany, *Luftwaffe* Messerschmidt and Fockewulf fighter pilots, deceived by the American plane's somewhat unwieldy appearance, would attack with vigor, dropping confidently down on their intended quarry with the conviction that their lighter aircraft would assure them victory. They quickly realized their mistake. The powerful "Jugs" inevitably turned on their attackers, and employed their devastating fire power on the more vulnerable aircraft with tragic results for the Germans.

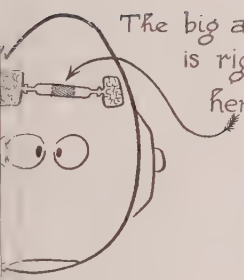
These tactics, combined with the *Thunderbolt's* near indestructibility, won U. S. pilots continual victories over German territory until the consequent death of the *Luftwaffe* in 1945. After that, the "Jugs" had a perpetual (*Continued on page* 37)

THE "JUG" was one of wartime's truly great airplanes. This final flight of "Jugs" was made recently when F-47's were flown to Air Force Depot

"Meet The Show-off—Aviation's mortal enemy"

DILBERT

By S. H. Warner and R. Osborn



Air Locks—It is an interesting fact that very few aircraft accidents occur as the result of only *one* mistake. Usually there is a combination of errors involved, the correction of any one of which would have prevented the crash. Of course, these extra chances all work to your advantage; unless you are a Dilbert. When that Meat Head gets mixed up in an emergency, he goes out of his way to botch things up. Here is a mild case.

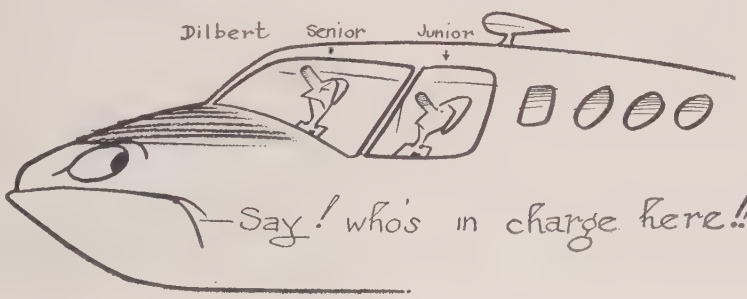
He was cruising along at 3,000 feet when his engine sputtered and quit. It started again at 500 feet after he had manned the wobble pump and shifted fuel suction several times. After regaining altitude to 800 feet, the engine failed again. A forced landing was made during which the airplane received major damage.

Investigation revealed that the left main tank was empty and the right main full. No defect was found in the fuel system. It was the concensus of opinion that; a. The first engine failure was caused by exhaustion of fuel from the left tank; b. The second failure was caused by loss of fuel supply due to air locks in the fuel system; and c. The air locks were caused by Dilbert who, apparently uncertain as to which tank was empty, shifted his fuel selector valve back and forth between tanks in his efforts to regain suction.

Of course, if Dilbert had not run his tank completely dry, there would have been no emergency. Even then, there need not have been an accident. All that was ncessary was for Dilbert to know which tank was being used, and how to shift tanks when the necessity arose.

Don't forget—any time you haphazardly shift suction back and forth between an empty tank and a full one, you are very apt to cause air locks, just like Dilbert did.

The Instructor Holds the Bag—One of the reasons a twin-engine trainer was completely wrecked was simply because the instructor neglected to lock the tail wheel. Another reason was that he failed to take over until the crash was unavoidable. He failed to lock the tail wheel when he turned the airplane over to his student for his first take-off. The student wasn't actually a (*Continued on page 51*)



CAOA REPORT . .

CORPORATION AIRCRAFT OWNERS ASSOCIATION, INC.

Corporation Aircraft Owners Association is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminating legislation by Federal, State or Municipal agencies, to enable corporation aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. The CAOA headquarters are located at 444 Madison Avenue, New York 22, N. Y.

Under the Wire

We were glad to get the applications of six companies just in time to include them in the new directory.

Krafco Container Corporation, Dallas, Texas, operates a Lockheed *Lodestar,* based at San Antonio. G. W. Scrimshaw is president, and Don Ice is chief pilot and CAOA representative.

Rock Island Lumber Company, St. Paul, Minn., operates a Beechcraft D-18S. Alexander Helmick is treasurer of the company, Charles H. Wilson, pilot, and Donald M. Lockler, co-pilot.

International Paper Company of Mobile, Alabama, has operated aircraft in connection with its business for over 10 years. Present equipment consists of a *Lodestar* and *Twin Beech.* H. S. Galloway is Asst. Treas, and Asst. Secretary, Carl J. Lund is chief pilot, and A. D. Boswell, company pilot. Co-pilots are A. B. Anderson, G. E. Holland Jr., and Joseph Croom.

Harper-Turner Oil Company of Oklahoma City, brings the total of oil companies in the Association's membership to 12. The company operates a Beechcraft D-18S, based at Will Rogers Field. Pilot is Floyd F. "Punkin" Pitts.

Triangle Conduit and Cable Co., Inc., New Brunswick, N. J., operates a modified Douglas A-26 and *Twin Beech;* a Lockeed PV-1 is under conversion for delivery during February which may take the place of the A-26. These aircraft are kept on a long-range schedule of trips between Plant 1 in New Brunswick, plants in West Virginia and Toronto, and 27 district sales offices. L. N. "Larry" Lacey is chief pilot, and T. M. Trimble, co-pilot.

Crane Company, Chicago, makers of valves, fittings, plumbing and heating equipment, operates a Douglas DC-3, based at O'Hare Airport, Park Ridge. President J. M. Holloway and/or chief pilot R. A. Mulherin will represent the company at CAOA meetings. "Randy" Mulherin is a well-known pilot, having been with the CAA for 10 years, seven of them in Washington as Chief of the Flight Inspection Division.

Revised Directory

The January 1951 edition of the CAOA *Directory of Executive Aircraft* is now in the hands of all members, and also has been distributed by the CAA to all air traffic control towers, air route traffic control centers, interstate airway communication stations, and regional offices. Distribution from CAOA headquarters is being made to members of the National Association of State Aviation Officials (NASAO), the Airport Operators Council (all terminal-type airports), and to key members of the American Association of Airport Executives (Triple A-E).

The membership now operates 236 aircraft. Of these, 175 are multi-engine aircraft and 61 single-engine.

Aero Commander

Aero Design and Engineering Company, Oklahoma City, is expecting to have its new twin-engine type plane on the market by early summer. The Aero *Commander* is a promising contender in the company-aircraft field for an economical, fast, safe twin-engine plane. Company officials state that orders are on hand for continued production for at least two years. Price has not yet been announced, but is expected to be around $40,000.

The Aero *Commander* is powered by two 260-hp Lycoming engines, has a speed of 200 mph at 10,000 feet. Gross weight is about 4600 pounds, and maximum range 850 miles. ATC was issued in June 1950.

New Rain Repellent

Several operators of company aircraft have been using FC-10, a rain repellent developed by the National Research Council of Canada, manufactured by Fiberglas Canada Ltd. of Toronto, and marketed in the United States by Regal Air Corporation of 41 Palisade Ave., Jersey City, N. J. through a group of nationally recognized distributors.

According to NRC reports and extensive testing by the manufacturers, airlines and military pilots, improvement in visibility for the treated portion of windshields over the untreated portion is at least 80 per cent. The repellent film is entirely invisible, introduces no optical distortion, and is equally effective on glass or transparent plastics. Vision is also markedly improved during light icing conditions.

Flight Plans Mandatory in ADIZ

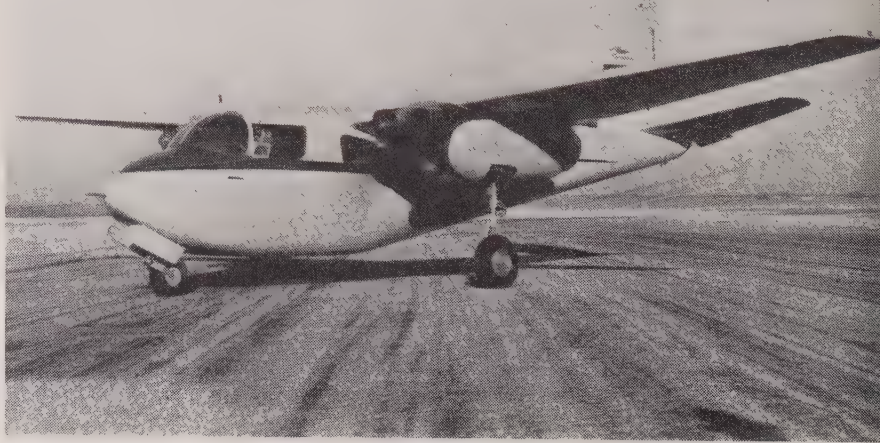
According to new regulations of the Administrator, CAA (Part 620, Security Control of Air Traffic) filing of flight plans are mandatory for planes entering or flying within designated Air Defense Identification Zones (ADIZ) over and adjoining the continental United States. Flight plans and position reports are necessary in these areas so that the Air Force can recognize friendly aircraft.

A system for voluntary filing of flight plans in connection with ADIZ has been in effect for some time, and the new regulations will do little more than make the voluntary system compulsory, in view of the current international situation, and a few violations.

Three ADIZ, which are several hundred miles in diameter, surround atomic energy plants. These are the Northwest, Albuquerque, and Knoxville Zones. Close to the plants themselves are relatively small prohibited areas, from which all flying is excluded regardless of flight plans. Two additional identification zones surround San Francisco and Los Angeles.

The U.S. Atomic Energy Commission has printed a large number of up-to-date maps (30" x 27") clearly indicating the Prohibited Areas. These are being distributed by the CAA to all airports listed in the Airman's Guide, control towers, control centers and communication stations for posting in a conspicuous place.

NEW EXECUTIVE PLANE due on the market in the very near future is this twin-engine six place Aero *Commander.* It is powered by two 260-hp lycoming engines; and is in $40,000 class



CAA's Own Island

(*Continued from page 21*)

positions: as an employee of the Department of Commerce, he's governor of the island; as a deputy marshal, he's also the law. On Sunday he even doubles as an Episcopal lay reader when a Protestant or Catholic minister is not flown in from Guam or Honolulu. When the regular minister is on the island, he plays the organ. And these are just a few of his jobs.

As a gag, United Airlines' Captain Gil Sperry made a scroll-type check-list for Mr. Musson so that he could identify which of his 15 jobs he was performing at the moment. Then, it was reasoned, he wouldn't have to change hats.

"We're actually like a small Naval Air Station here," explained Mr. Musson. "Except for the fuel and supplies that must be shipped or flown in, we have a completely independent community. We make our own light and power. We distill our own water. We run our own mess and commissary. This is on of the few places where the CAA has a Navy. We operate two barges and a LCM (landing craft medium). The Navy and Coast Guard "reefers" service furnish all normal supplies, and fuel is transferred to storage tanks by tankers anchored off-shore."

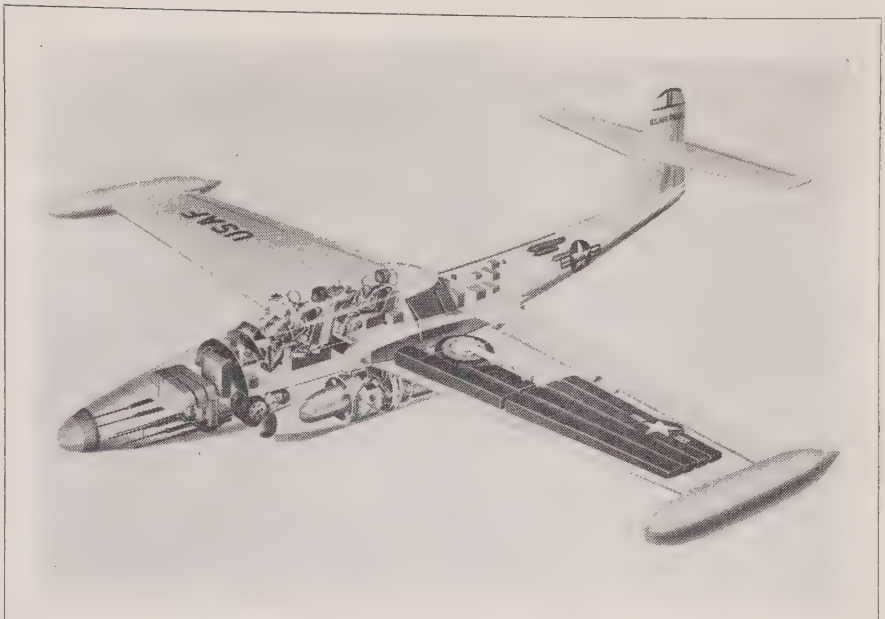
Wake is actually three tiny islands formed like a wishbone. The main island—all two and one-quarter square miles of it—has the airport and nearly all housing. Peal Island is a mile-long stretch of sand on the north and Wilkes Island almost touches Wake from the east. A shallow lagoon is in the center with coral reefs across the entrance. The average height above the water is only 10 feet and the highest spot on the island, not counting the control tower, is only 21 feet above high tide.

It was the lagoon at Wake that first attracted the attention of Pan American back in 1935. The original Pan American base here was built to handle the China Clipper flying boats that established the first trans-Pacific flights just prior to Pearl Harbor. These flying boats landed in the lagoon instead of the open sea.

Wake is actually the turning point of the Pacific. Flights from here either go west to the Philippines or north to Japan. The nearest island to Wake is Kwajalein, 660 nautical miles due south. Wake is roughly half way between Midway and Guam and is the midpoint of the Pacific Airlift hop between Honolulu and Tokyo.

All around this little island are the grim reminders of the days immediately following Pearl Harbor. The Japanese attacked the island from December 9 to 23 before the tiny group of Marines, Pan Am workers and Morrison-Knudsen Company surrendered. Five-inch shore batteries on Wake damaged and destroyed the first Japanese ships of the war. Even today the beaches are littered with red-orange rusted landing craft and the piles of sand and coral that form the island itself are honeycombed with carefully built pill-boxes. Stone-lined airplane revetments still stand near the passenger terminal and the bombed-out steel shell of a half-built hospital is rusting in the tropical sunshine.

Most prominent of the war wreckage is the hulk of the NYK luxury liner *Suwa Maru*. This ship lies beached on the coral reef within a stone's throw of the end of the present runway. The Japanese skipper of the liner ran his vessel ashore when he thought he was about to be torpedoed by an American submarine. Kicker to this story is the fact that there wasn't a submarine within a thousand miles of the island at that time.



F-89 Phantom View

This phantom view of the Northrop F-89 shows the over-all arrangement of the AF's all-weather interceptor. Heavily armed, this twin-jet aircraft carries crew of two and is equipped with latest electronic devices for night and bad-weather operations. Note the six 20-mm cannon mounted in the detachable fuselage nose.

Bulldozed aside, to make room for the present heavy-duty runway that will handle the touchdown weight of any plane yet built, are the wrecks of countless military planes, both American and Japanese. Rusted engines with their propellers tied in knots where they crashed on the runway have been shoved aside in a grim pile of debris. A Japanese *Zero*, it's red "meatball" insignia still visible, is in plain sight of aircaft landing on the runway. Beached inside the lagoon is the hulk of a four-engined *Mavis*, at one time the fastest flying boat in the world.

Because of these macabre relics, Wake is one of the most photographed islands in the world. There is a Quonset hut that once served as a photo lab, but all film is normally flown to Honolulu for processing. The semi-natural darkrooms, made by abandoned air-raid shelters, have been used by many transient photographers who wanted to reload their film holders.

Most of the permanent residents here on Wake Island are CAA plant and structures employees. Communications operators, electronics maintenance men and tower operators form most of the remaining 70-odd employees. Most bachelor assignments are for six months at a time while CAA men who bring their wives are expected to remain for one year. There are 20 married couples now on the island who are employed by the CAA. Pan American has four wives on Wake and Trans-Ocean has one. A 25 per cent pay differential makes this out-of-the-way spot an excellent place to save money.

There are over 40 radio transmitters on the island. Pride and joy of the CAA is the newly completed 10-kilowatt homing beacon that transport planes can pick up 800 to 1,000 miles from the island. CAA also operates radio-telegraph and radio-telephone facilities for maintaining constant contact with planes flying civilian routes converging on Wake. Most communications, including flight plans, are carried through a radio-teletype system with Honolulu. There are a surprising number of "ham" radio sets on the island, operated by CAA radio men in their off hours.

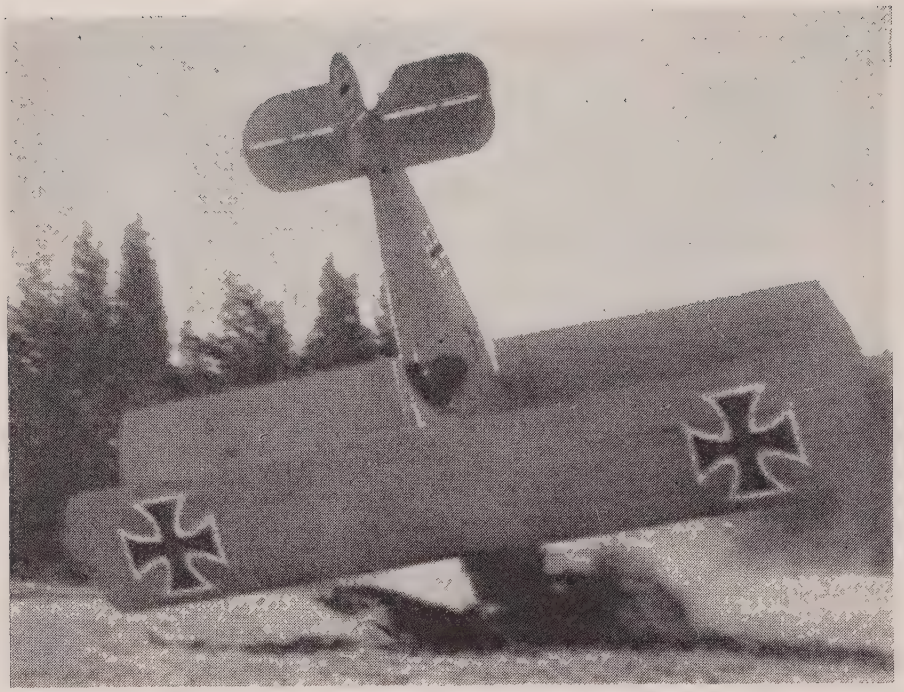
"What do you ever find to do in this forsaken place?" is usually the first question a visitor will ask.

Actually, there's plenty of recreation. The CAA motion picture house—an open-air affair—is called "The Windy Palace" and shows the latest movies four nights each week. Pan Am flies the films in from Honolulu. A popcorn stand adds a touch of stateside atmosphere. The island boasts of three clubs. Pan Am's gathering place is most popular on hot afternoons since the sign over the bar reads "beer only." The CAA's club features bingo once a week. At the other end of the island, Trans-Ocean has a "Drifter's Reef" for the more alcoholic minded.

There is excellent tuna and barracuda fishing as well as swimming in a sheltered spot in the lagoon between Peal and Wake Islands. However, you don't swim in the main lagoon or the open sea because of sharks. Many an airlift pilot will break-out a brand new fishing outfit purchased the day before in Tokyo and get his line wet for the first time during the "crew rest" at Wake Island. There isn't a post office on the island, but mail call is held four times each week. When you're this far from home, that too is a social affair.

There are a few relatively new CAA automobiles and trucks on the island, but the bulk of the vehicles—jeeps, weapons carriers and half-ton trucks—have been rebuilt from equipment left on the island as surplus junk. A portion of this surplus equipment was sold at one time to the Chinese Government and

(*Continued on page 38*)



NOSE-OVER crash, like this for movies, will be safer if speed is reduced by prolonged contact

Crash and Walk Away

(*Continued from page 29*)

to be in the clear, and what difficulties you may meet before you have put enough altitude between you and what you have left for field. Most important—did you solve the cause of your emergency landing? If you are not completely satisfied that you have located your mechanical trouble and then try to get out despite that dissatisfaction, you are really asking for it. Nine times out of 10, the "trouble" will show up in take-off, which should not surprise you because you're working the engine hardest at that time.

But you know all these things and a thousand more like them. What you'd like to know is how to "do a crash" if you ever have to. The few things I have mentioned, plus a lot more I'd like to write about, will help keep you from a serious-injury crash landing.

In the first place, there is not much danger in a crash landing *if* you have a plan for it. These are words I have said to myself over and over during a third of a century of flying. They are words I used before the term "procedure" ever came into use.

Planning a crash successfully demands two things. First, that you confront yourself with all the possibilities of what *could* happen to you—with a procedure and solution for each one of them. Second, that you put each solution or procedure into effect at the right moment.

This putting a plan into effect, making an ordinary procedure of it, is not the easiest thing to do. When your engine quits, your heart jumps up in your throat. If you haven't much altitude, you may be one of those who thinks it's siesta time and literally goes to sleep on it. Your brain ceases to function and valuable seconds are lost where there's no time to lose. Peculiarly, it's the swashbuckling type of show-off who brags about how many power lines he's flown under, who usually fails to come through an emergency situation in a reasonable way. There is plenty of time and a proper solution for every predicament for the clear-thinking pilot who immediately recognizes a problem which, though serious, is not the least bit dangerous.

If there is no field in which to make an emergency landing, and you are faced with no alternative other than to crash land, survey the different landing-area choices, and promptly eliminate those that would require a stretched glide to get in at all. It is much safer to choose a spot which lacks some of the advantages but which is within easy glide distance.

The conservative pilot will also eliminate those spots requiring a straight-in approach, unless he is so familiar with his ship's dead-stick glide that he can crash land *on the spot he has picked* with no more force than if he had made a base leg.

This base leg is all important because it will compensate for mistakes in judgment or estimate. It will care for variable wind currents, sudden gusts or lulls, and allow a practical pilot to tie into the final approach at the exact angle, the exact altitude, and the desired speed at the precise moment a ground approach must be made.

Even if a pilot's judgment is not infallible, by executing a neat base leg he obviates all worry of overshooting or undershooting. The turn from the base leg to the final approach should be a concise 90° angle—not sloppy or flat or in an arc. The base leg should be close-in to the spot on which the ship will ultimately end. The base leg should not be so far out that there might be a chance of undershooting, and it should not be so close that you tie yourself in knots unbending to it.

When you have reached and cleared the last obstruction, you should be just a little above stalling speed, but be sure you always have speed enough for control.

From now on you are in little danger. Your speed should not be over 60 mph in the fastest of small airplanes. With a little headwind, it should be anywhere from 35 to 45 mph.

It is taken for granted that there will be no loose, untied cargo in the compartment and that the pilot will have told his passenger or passengers to fasten safety belts.

There are a few elementary facts which all pilots should know about crashes. A crash is a time-and-distance problem. The interval between the moment of impact or contact until all forces is expended is important. The amount of distance covered in that interval is even more important.

In the solution of many of my problems in crash landings for the movies where excess speed is almost a foregone conclusion because of the spectacular results desired, the space between the point of first contact and the ultimate resting place of the movie-required wreck has everything to do with injuries which might occur. If the dissipation of forces can take place over a longer period of time and over a greater distance, the pressures are less on the individual. Drastic changes in pressure mean injuries, unless particular equipment such as my specially designed chest belt is used.

Realizing that if you crash on level ground you are dissipating your forces over a possible 180°, your approach must be made at the smallest attainable angle to the horizontal to have the ideal time and distance solution.

If it is desirable to hit wing first (wing low), the angle of attack may be materially increased and the over-all length and duration materially decreased without injury to the person. But this will most certainly wash out your airplane or, in all probability, cause major damage to it. It is never advisable to hit directly on the nose, *ahead of wheels*, since all forces are then transferred to the cockpit and its occupants. Few aircraft other than military are stressed to take excessive pressure on the nose.

If it is necessary to go over on the back to foreshorten the distance, a controlled and more or less synchronized movement of surfaces is to be desired. Wing first, then nose. This should not take place until the speed is reduced in light airplanes—if possible by prolonged contact. The line of direction will be diverted and so will the lines of force—and the cockpit will receive a minimum of damage.

I like to crash right wing first—in fact I am a firm believer in it. If you *must* sustain injuries such as broken ribs, there is little chance of those injuries damaging the heart. That organ itself will miss a lot of abuse and shock. I've hit so hard that my entire chest, abdomen and torso were black. If such external and internal injuries had occurred to my left side, I have been told by doctors who examined me that there would have been great damage to the heart.

In coming in for a crash landing, the pilot must take in every detail. The first survey had better be good—you probably won't have a chance for another look. It's against all the rules of a safe crash landing to have to change your mind, switch your procedure and start all over again within the last few seconds or the last couple of hundred feet. You may end in an uncontrolled, undesigned finish which could result in an absolute washout.

There are many examples of crashes of this kind because of failure to note all the details, but one which pops up now and

hen is the old under-the-wires landing. Landing under wires is not desirable at any ime. Any line away from a railroad may carry power to rural neighborhoods—and a brush with live wires isn't worth the risk f there's any other way out. Not only is he height of the power-line poles important but also their distance apart. If the poles are widely separated, there will be more sag in the wires and you won't have near he clearance mid-way between the poles hat their height would indicate. Sometimes hese lines are less than 10 feet off the ground. Getting under them without power demands tricky precision flying. The number of power or telephone lines that haven't a fence under them in the near vicinity is negligible. Some of these fences are almost invisible from the air. The barbed wire can be and often is a single strand—seldom over two—which is invisible. And don't look for standard-height fence posts. They may be as low as 30 inches, just high enough to keep cattle from a field. If fences are weathered and surrounded by green vegetation, he first indication you'll have that all is not going so good is when you crawl out.

Cockpit procedure should be well ordered and followed through without much deviation, depending on individual equipment and pilot paraphernalia. Once you know you have a crash coming up, you should cut the switch, turn off the gas and all electrical devices.

Depending upon speed and type of crash, here are a few "musts" which should never be violated. At one time or another, goggles and sunglasses should be disposed of at the earliest possible opportunity previous to primary impact. This also applies to those who wear eyeglasses, but don't get the flutters and throw your sight away too early by heaving out glasses you have to see by. On the other hand, if you don't get rid of them just prior to the crash, they'll be daggers pointed at your eyes all the way through.

Control in. Just because you are near the ground or have made primary contact with it doesn't mean you have lost control. Some of your controls will still be with you. Use them—don't let them get away from you and pile you up even higher.

Get your feet back the minute you contact the ground. In a few instances they should be off before impact. Never during any part of the dissipation of the main body of force should the feet be near the paddders. Don't let loose of the wheel or stick too soon. At the last moment, push the controls forward, but not while you may have any use for them.

When everything is taken care of, cover your head with your arms. You may avert serious head injuries or facial lacerations.

Remember, your belt must have been regulated so that it's a tight fit across you. This is more important than it appears. If there is a lag of three or four inches, you may get a whip which could result in serious injury. It will cause a snap at the last moment.

You don't have to get inquisitive and watch what's happening. There's not a thing the world you can do about it. Have your head forward so you won't snap your neck. If you absorb much shock, you'll find you have a stiff neck. And again, don't forget to wind your arms tightly around your head one across the brow and the other above it. Please don't sit up straight and stiff as a board.

Lastly, with any shock at all you are apt to have the wind knocked out of you. But that is nothing that hasn't happened to millions of persons before with no grave results, so don't try to do anything extraordinary with your breathing apparatus. It is absurd to take a full breath and hold it. That can cause all sorts of injuries which would never occur. Carry on in as much the normal way as possible. If you attempt to control breathing, you may neglect one or many of the things necessary at this time.

Once you have crashed, once the movement is over, don't stay with the ship longer than necessary. But don't let the flush of excitement, which is almost sure to occur, make you break records in getting out. Take it calmly. If you are not upside down and if it won't change your position by doing it, release your belt. Work yourself out of your problem from there. If you are inverted and no one is available to help, you should still get out. But don't break your neck doing it. Find a purchase above you to break your let-down and be sure you have head room below. If there are two of you in the ship, side by side, you can use both arms—for the other occupant can unfasten your belt. And, as soon as all motion is stopped, when inverted, please don't forget to warn everyone to keep belts fastened until you can get at them to give them a hand.

Finally, if such an unfortunate predicament ever arises where you must make the best of a bad situation and bend up your airplane, remember that you're the pilot and that makes you the boss until after you touch the ground. If your time-and-distance planning has been on-the-money, there isn't a thing to worry about. Just crash—and walk away from it.

Flying Bricks

It cost $11,000 to fly $600 worth of fire bricks from N.Y. to Cairo. But furnaces costing $4,000 per day while idle, were quickly repaired. "Planes"

Farewell the "Jug"

(*Continued from page 31*)

field day over enemy soil. No installation, train, ship, or convoy was safe from their chattering guns and destructive loads of bombs. They did more than their share in dealing the death blow to a once powerful war machine which they had already helped to cripple both military and industrially. Their countless thousands of missions against the enemy counted heavily in eventually bringing the stubborn Nazi Regime to its knees.

Capt. Alva N. Temple and Lt. Halbert I. Alexander, the two oldest F-47 pilots in the 527th, are both staunch supporters of the famous old fighter. When asked what they thought of the *Thunderbolt,* their statements held nothing but praise for the plane in whose cockpit they had spent so many hours.

"I liked the old 'Jug'," said Capt. Temple with what sounded suspiciously like a sigh. "It was an excellent ship, but it's obsolete now and it has to be replaced to keep up with the times. But I actually hated to see it go out."

And Lt. Alexander said, "The F-47 was undoubtedly the best all-round fighter I have ever flown and, during its day, was unbeatable."

Another old "Jug" man is M/Sgt Billie D. Brannon, an aerial mechanic who was assigned to one of the first F-47's off the assembly line and has been working on them up until recently when they were replaced with the new Republic *Thunderjets.* When asked to give his opinion on the "Jug," the greying master-mechanic replied thoughtfully, "I started out with the first F-47 model, and I've been working on them ever since. They're a little rough on a mechanic, but I'm convinced that for what they were made for, ground support, they're one of the ruggedest airplanes ever built."

Yes, the "Jug" is gone. But in going, it has left its imprint upon the hearts and minds of pilots everywhere, airmen who, in the future, will look back with pride and admiration as they remember the day when the *Thunderbolt* struck and passed and left its mark upon the world.

AIR FORCE'S newest jet fighter, the Republic F-84F *Thunderjet* is shown here firing a portion of its load of 24 five-inch rockets during flight test at Muroc's Edwards AFB. This newest version of the F-84 can carry a greater load of armament than these rockets, but details are restricted. We do know that the "F" out-performs the F-84E.

CAA's Own Island

(*Continued from page 35*)

later bought back by TransOcean Airlines. There are 15 miles of not-so-smooth roads on the island.

The popular misconception of a warm tropical hide-away with waving palm trees and a lovely dark skinned maiden—as shown in the travel folders—does not apply here at Wake. True, you've got the languid weather and the tropical moon, but that's about all. There are no palm trees on Wake. The only vegetation is tunafortia and scaevola bushes that grow up to 10 or 12 feet tall. Even these are of very recent vintage because all vegetation was completely destroyed by wartime bombing and strafing. Then, too, Wake has its own particular brand of rats, ants and mosquitoes. The vermin thrive on this island and only steady policing keeps them partially under control.

Before 1935 Wake was an unpopulated atoll, mainly because there was no fresh water. Today, the CAA's "stills" would make a moonshiner green with envy. They produce 12,000 gallons of drinking water from the ocean in a 10-hour run. Pan Am also owns and operates two new "stills," each capable of producing 250 gallons per hour.

The island was originally discovered in 1799 by the master of a British trading schooner, the *Prince William Henry*. Modestly, the skipper named the place after himself. In 1866 a vessel named *Libelle* was wrecked on this atoll while traveling between Hong King and Honolulu. Then the island remained uninhabited until Pan Am came along.

Most of the labor employed by Pan American comes from the Gilbert and Ellice Islands while TransOcean employs mostly Philippine boys. Chances are that the young bus boy who serves your dinner has flown more miles than many a stateside business man because these airline employees "deadhead" home frequently when there's space on company airplanes.

Wake is just one of a string of islands operated by airline and military staffs as part of the U. S. share in the international aviation picture. Flight assistance services are available to airlines of all countries.

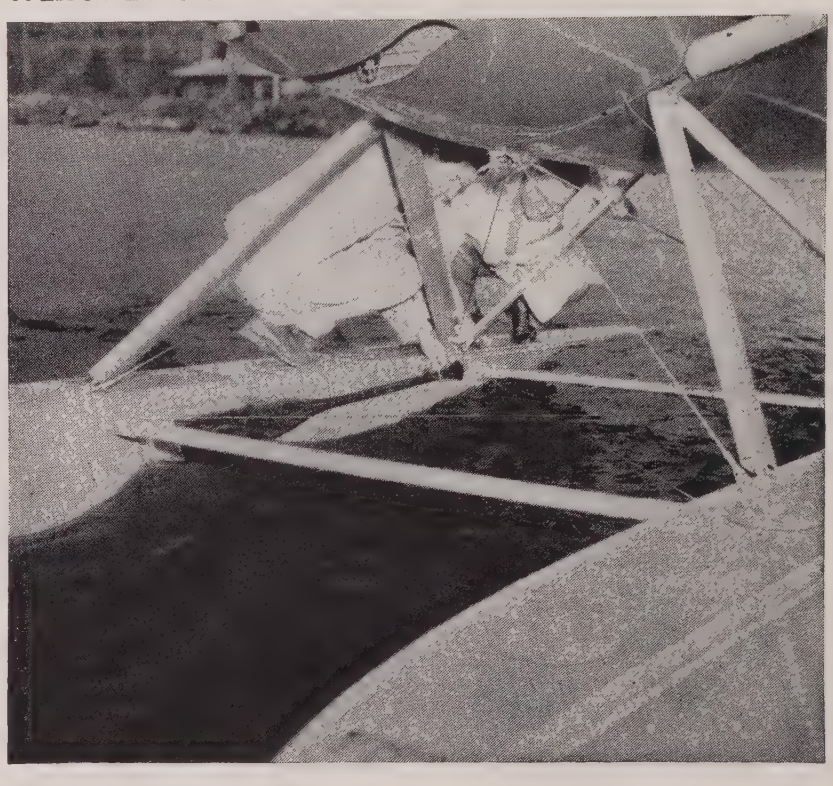
Because of the steady stream of scheduled traffic into this otherwise isolated spot, the CAA does not keep a doctor on the island. They do, however, have a nurse and a medical technician. All personnel needing medical treatment are flown to Guam, Kwajalein or Honolulu, depending on what airplane is first to depart. Even dental patients are flown over 2,000 miles to Honolulu for extractions or fillings. Although on at least one occasion the CAA flew a Honolulu dentist to Wake, and during his stay of two or three days he took care of the dental needs of all Island personnel.

Many of the permanent employees even send their laundry to Tokyo or Manila.

Life in a small community like Wake must grow on people. Many of the CAA employees have been here for three years, and don't seem to want to go home.

"If I had a pass on any of the airlines that go through here, I might ride as far as Honolulu, but I doubt that I'd go clear to the mainland," said Mr. Musson, the island manager. "These islands kind'a a grow on you as the days go by."

WINGTIP . . .



HANDY spot for a paddle! Every seaplane pilot should be sure to carry a paddle along with him, just in case the engine quits while he is taxiing, or in case the water rudder becomes ineffective. This thoughtful pilot fastens his paddle, ready for use, to the right float. *B. Blatt.*

In-Air Refueling

(*Continued from page 25*)

delivery pressure in excess of 60 pounds per square inch. At the same time this mechanism allowed an easy withdrawal when the fighter wanted to break contact.

When the probe and the cone had made the proper connection, valves were opened automatically at the end of each, establishing an unrestricted passage for the fuel. It had been previously mentioned that as the fighter advanced a few feet the hose drum started to rotate to take up the slack of the hose. When the drum had made one complete revolution, a mechanism caused the main fuel valve to open and the kerosene then started to flow from the tanker to the *Meteor*. In this position sufficient clearance fore and aft permitted the fighter to advance as much as 20 feet without getting too close to the tanker. A signal light below the tanker turned on automatically and stayed on as long as the aircraft was in such a position as to keep the fuel valves open.

Since the fuel is pumped into the receiving plane under pressure, either the tanker or the fighter (or bomber or any other aircraft for that matter that is to be refueled) may be equipped with a probe and either plane may then take the lead. And since kerosene is not nearly as inflammable as gasoline, it was not necessary in this case to flush the pipeline with nitrogen, as is done when transferring fuel to planes equipped with reciprocating engines.

During the refueling operations, both planes flew at a speed of 190 mph.

Fuel was transferred at the rate of a little better than 100 Imp. gallons per minute and both tanks of the *Meteor* were filled simultaneously. However, by option of the pilot, each tank can be filled separately. The average time from contact to break-away is less than three minutes. Since that first in-air jet refueling experiment, Flight Refueling Ltd. has developed a special light-weight high-pressure fuel pump which will make it possible to transfer fuel at the rate of 300 Imp. gallons per minute.

A pull of 300 pounds will separate the connection between the probe and the cone. This makes the break-away a very simple procedure—the fighter merely throttles back and the probe is disconnected and pulled away from the cone.

Since both aircraft are equipped with radar, poor visibility does not affect these refueling operations. In fact, due to heavy rain clouds, the last two contacts of the 10 made between the *Meteor* and the tanker had to be effected entirely by radar.

While tests showed the probe fitted to the nose of the *Meteor* had no measurable effect on the performance, Flight Refuelling Ltd. is developing retractable refueling points which will preserve a complete cleanness of line of the fuselage.

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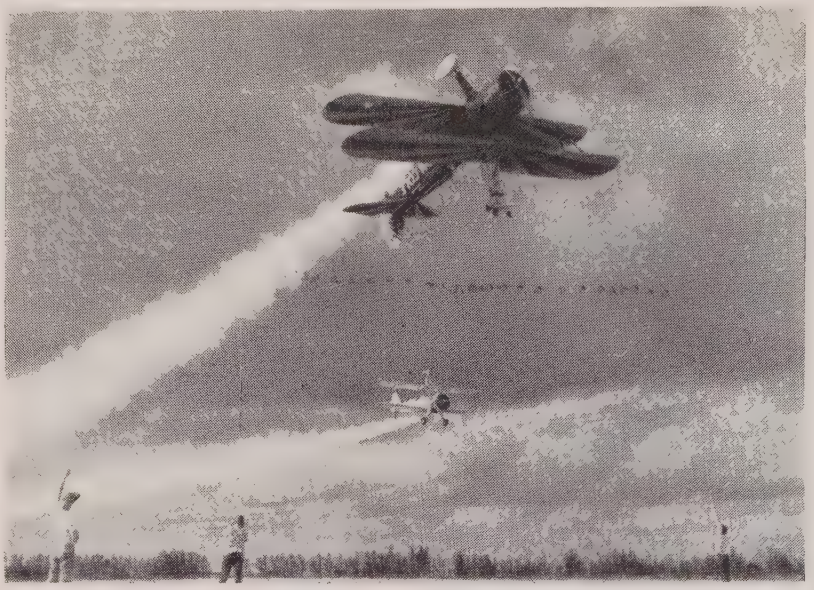


WING-WALKER—Flirting with death at Miami Air Show, this daring wing-walker on an inverted stunt plane is shown breaking a ribbon between the poles

Story of a Stall

(*Continued from page 16*)

recognition of stalls. These two earlier reports showed up the fact that typical student pilots, private pilots, and even flight instructors failed generally in recognizing the edge of stalls, even when they tried to do so! The reports showed that pilots doing pretty well in recognizing stalls in certain maneuvers, failed to recognize how near to the brink of a stall they were flying in others. Pilots able to out-guess one airplane failed to detect an approaching stall in planes of a different make.

Dr. Rulon combined enthusiasm with a scientific point of view. I asked him, "Is it true that the new method of stall recovery has already cut accidents in half where the demonstration plane has been?"

"Well, the figures say that," he replied, "but we fear they are based on a most regrettable sampling. It might be the pilot material, a seasonal variation or a number of other factors."

Dr. Dean Brimhall, the father of many improvements in pilot and plane safety, put in. "We must complete studies on *many* planes before we can send out a blanket recommendation. We did discover the 'On Horizon' method to be drastically better on the one plane tested."

Dr. Rulon agreed. "That's right. We found that the Piper J-3 recovered from a stall with much less loss of altitude, and we believe that would indicate that similar planes of the high-wing, tandem type would react the same. The Aeronca, the Piper series . . ."

"The Cessna?"

"Yes, the 120 and 140 series of Cessnas will behave much the same."

"About these former studies, before we get into the new one— Is it true that you found many experienced pilots using stall 'cues' that are not even mentioned in current air training manuals?" I asked.

"Yes we did." He hitched forward. "The one in particular that I found most exciting, not mentioned at all in current texts, was that of the stall in a turn.

"We found experienced pilots when approaching a stall in a turn invariably reported that 'something went wrong with the turn.' We did some detailed study to find out what they were noticing so that we might teach students to look for it."

"Was it a nose drop?" I put in.

"No. It was a faltering in the turn. Not a 'burble.' But before that, we found that the slower the airspeed, as long as the plane had its lift, the higher or faster the rate of turn. The thing the pilots were noticing was that instead of speeding up normally when the airspeed dropped, near the stall the nose began to falter—to swing around the horizon less rapidly. Also, as the pilots had also noted, the ailerons 'felt wrong.'"

"Now getting to this new report, Dr. Rulon. You mention in the foreword that typical pilots frequently depart inadvertently from normal flight in the direction of a stall. What maneuver is the most frequently abused?"

"Mainly, the normal climb," he said. "The student pilot is taught correctly but then he sees the instructor take the plane up in an impatient climb at a much steeper angle. The student copies this, if not then, later in his flying career."

"And it's not just new pilots who accidently get into stalls," Dr. Brimhall put in. "Two very excellent pilots flew over north of Washington one day to inspect an accident caused by a stall. In looking over the side to survey the wreckage, they stalled in themselves. Killed both men," he added somberly.

The new stall-recovery method, I found, was a radical departure from previously recommended techniques. They recommend three major types of recoveries:

When the engine is operating, or when extra power may be applied, the "On Horizon" method conserves the most altitude. That is:

1. Add full power.
2. Keep the nose on or close to th horizon.
3. Keep plane level, using rudder an elevator, going easy on the aileron. (Bu use the ailerons!)
4. Sit tight and wait until the plane re covers.

This "On Horizon" recovery takes longe than the more conventional "dumping" pro cedure of pushing the nose below the hor zon. In fact, in some maneuvers the new recovery takes as long as 14 seconds. How ever, by sitting through the "On Horizon recovery the pilot may effect recovery wit marked savings in altitude loss. Altitud savings run up to and exceed 100 feet. I some maneuvers using the "On Horizon method, recoveries can frequently be mad with a loss of altitude not exceeding 50 feet

For stalls where power is not available *i.e.*, in event of engine failure, etc., the re port recommends the most altitude-conserv ing recovery to be:

1. Lower the nose below the normal glid path.
2. Coordinate use of *all* controls.

For recovery from steep turns, the thir and last division:

1. Lower the nose below the horizon.
2. Coordinate use of all controls.
3. Do not attempt to continue the turn.

Remember, before you try these recoveries that just a *Cub* was tested. Your plane ma act differently. For security sake, climb t a safe altitude before trying it on you plane. You may find that its different desig may require more power than your engin can furnish due to more weight and drag There can be no doubt but that our idea are going to be altered as a result of thi first study alone. When, in the comin studies, data is completed on all types o planes, we are sure to emerge stall-happ and quite a hunk safer.

As though the loss of my "dumping" technique in stalls was not enough, the re search men had another blow in store.

"What is this about the ailerons bein used in stall recovery?" I asked. For year I had been beating students over the hea for using aileron in a stall.

"Yes. That *was* an interesting discovery." Dr. Rulon pointed to a graph. "You ca see here the use of the 'dumping' techniqu lost much valuable altitude. And you ca also see that in a significant number o cases the use of rudder caused the plan to lose more altitude than in cases wher the ailerons were used to help out."

"Then you recommend using the aile rons?" I put in.

"Not sloppy, clumsy use, and not in th stall itself," he replied, "but *optimum* us of ailerons as soon as they again becom effective."

"Why were we instructed *not* to use ther all these years?"

"Airplanes have come a long way," Dr Rulon said. "The use of ailerons in sta recoveries on early planes with their poo aileron control in a stall almost invariabl pulled the plane into a spin. Today, de signers have given us planes with excellen aileron control at low speeds. We advocat careful use of the aileron when you've go it. That is, right up to the edge of the sta and as soon afterward as control returns—

(*Continued on page 44*)

Hell Comes to a B-36

(*Continued from page 9*)

now, the slippery rocks and snow-covered logs upset his footing. Then suddenly all land seemed to drop away and he toppled eadfirst into space. In a moment Gerhart hit soft snow. Afraid o move, his candle snuffed out, he waited in the dark, rain falling nto his upturned face. What lay beyond the blackness? Perhaps ne nothingness of a precipice.

Cautiously he lighted his candle again. He breathed easier. He ad fallen into a deep ravine. Gerhart yelled to the other man, aying they both better stay where they were and wait for the dawn. Otherwise one of them might break an arm or leg stumbling about n the darkness.

The lieutenant lay down in the icy snow, wrapped his wet parahute about him, and tried to get some sleep. Rain drip, drip, ripped on rock poking through the snow. Slowly the damp cold ight wore on. . .

Gerhart awoke to the shouts of a crew member below him. Day vas breaking over the desolate island's rugged, snow-covered nountains, and no golden-rayed sun shone through the leadolored sky.

After rolling up his chute, the radar operator worked his way own to a joyous meeting with Staff Sgt. James R. Ford. Both nen were wet and cold, but otherwise in good shape.

Together the two survivors took Sgt. Ford's chute out of a tree nd, packing their chutes and Ford's one-man life raft on their acks, they began following a small stream. They wondered aloud hat had happened to the other 15 men of their ill-fated ship.

Sgt. Ford had a magazine, some matches, a pack of smokes, a ighter, and four signal flares taken from his life raft, but no ood.

Taking some dead wood and one of Gerhart's candles, the two opped to build a small fire, using lighter fluid to keep it going ntil the wood dried out. Gun shots broke the silence, followed y shouts. Gerhart fired two shots. Reports from different caliber uns came back, then shouts from different directions. The excited en contacted one man by voice and told him to come to them. hey continued shouting their position.

For two hours the airmen waited, but the other crew member d not answer their shouts. Ford and Gerhart looked at one nother. Had something gone wrong?

Hunger gnawed at their stomachs. Their strength was fast ebbng away. The weather looked threatening, at any moment the ain might change to snow. Before they grew any weaker the two en headed for the coast in a desperate attempt to make it before nother night closed in on them.

After an hour's walk the two men heard shouts echoing among e hills. They called out, pushing toward the outcries. Two men t. Stevens, and Lt. Col. McDonald, topped an outcropping. Folwing greetings and back slapping the men heard a whistle. It as Staff Sgt. Dick Thrasher, the voice Gerhart and Ford had eard back at the other end of the lake. This now made five men the party.

The survivors decided to camp for the night and head for the ast the next day, before their bone-weary bodies gave out. On e only clearing to be found, a small isle in a frozen-over pond, e Air Force men made a shelter of their parachutes.

At the base of a tree Gerhart built a fire with some wood he and ord saved from their last small blaze. The sound of a plane made e men stop what they were doing and peer skyward. Far off the grey sky they spotted an aircraft circling. Feverishly, they aped green boughs on the fire for a smoke signal, but the plane oved farther away and soon disappeared. High spirits plummeted a second. Yet there was hope, for the search was on.

The rain, which had not stopped since they bailed out of their 36, continued falling. The airmen tried to dry their clothes, t it was hopeless. The rain fell faster, harder, then changed to ow.

Only by the most vigilant watching did the tiny fire burn at all. ighting with all the ingenuity man can muster, the survivors unrthed dead trees, broke them into firewood and gathered spruce ughs to lay upon the snow for their beds.

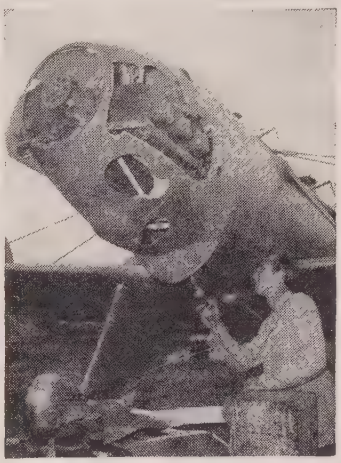
The five weary men talked of food for a time, then conversation ed for the night as each man turned inward to his own thoughts, rs or hopes. Each time someone dozed off he almost toppled o the fire. Too miserable to really sleep, all of the men stayed ake nursing the pitfully small fire (*Continued on page 42*)

Franklin-Powered PT-22

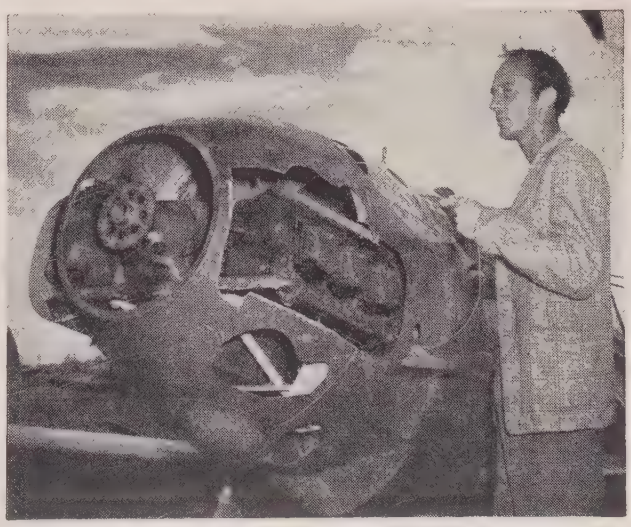
PILOT-OWNER William Schmaltz took 150-hp Franklin engine out of Stinson *Station Wagon* and mounted it on his PT-22

Wm. Schmaltz of Inglewood, Calif., is rebuilding his war surplus PT-22, and CAA thinks he's doing a fine job of it. Mr. Schmaltz is shown here mounting 150-hp Franklin engine in the nose. This engine is 98 pounds lighter than the ship's original Kinner, and 15 pounds of lead originally installed in the tail for balance has been removed. Total weight saving is 112 pounds.

FRANKLIN engine is 98 pounds lighter than PT-22's original Kinner engine, but total weight saved is 112 pounds



MOTION PICTURE projectionist by night, Wm. Schmaltz spends his days working on the war surplus Ryan PT-22



Hell Comes to a B-36

(*Continued from page 41*)

and asking themselves if any dangerous animals prowled this island, and wondering what fate had befallen the 12 others. Toward morning they threw the boughs their bodies had lain upon into the dying flames.

Throughout the dismal night each man kept instilling in his mind the undeniable fact that USAF planes were searching for them. This was the one ray of hope. They prayed the planes might find them soon.

Dawn finally came to end the long, wet, cold night. Stiff, sore, hungry and soaked to the skin, the men broke camp. Three carried parachutes on their backs while two others packed a one-man life raft each. Gerhart took some marker from a Mae West and put a larger "X" in the snow and an arrow pointing toward the coast.

At 7 A.M. the five airmen headed for the sea which they figured was four or five miles through the mountains. Every 30 minutes another man moved up to take the exhausted trail breaker's place. Heavy snow, large rocks and steep cliffs made the going so hard the entire party had to stop to rest every 200 yards.

About 11 o'clock in the morning the party was halted by shouts for help. They answered and began working toward the outcries. The voice was that of Sgt. Trippodi and he said he was hurt. He pleaded for them to come and get him. The Sergeant said he had hung by one leg all night. A 200-yard cliff of sheer rock blocked the five men's path. On top of the cliff lay Sgt. Trippodi.

Trippodi said Capt. Barry, the plane commander, and Lt. Whitfield had found him, released him from the tree and stayed with him during the night. That morning they had left for the coast in an attempt to get help.

Each man in the party knew that facing him now was the hardest decision of his life. Once they did get to Trippodi they could do nothing to help—no one had first aid equipment. They even lacked the strength to carry the injured man. Reluctantly, they decided to leave Trippodi and get help for him. Before turning away the men vowed that if a plane dropped food to them at the coast they would go back to the cliff and stay with "Trip" until rescued.

Crunching through the deep snow, checking their compass every few minutes, the men fought their way westward. Topping a hill the party saw the ocean coast far below. New vigor and hope surging into their tired bodies, they pushed on.

Later they came upon the tracks of two men. The party followed eagerly until the tracks ended at a log that sprawled across a swift stream. One by one the men crawled on hands and knees across the log, picked up the trail and followed it along the coast.

Soon they came upon Lt. Whitfield, the lost superbomber's pilot. He and Capt. Barry had selected a spot 75 yards from the water's edge and had tramped an SOS in the deep snow and filled it with branches.

After a joyful reunion the men, seven strong now, set to work making a fire and hunting wood. Making a broth from dry moss, they drank hungrily. The party of five men had walked seven hours and covered about three and one-half miles.

Capt. Barry related that after spending a cold night bundled in his wet parachute he had met Lt Whitfield. About noon they heard shouts for help. They ran to where a parachute dangling from a tree caught their eyes. Scrambling up the cliff, Barry found Sgt. Vitale Trippodi hanging head down by one foot. He had been hanging there by one ankle for 12 hours!

Barry released radio operator Trippodi, who had sent the last radio message to the world from the dying aircraft, then before bailing out, had tied down the transmitter key. The sergeant's foot looked frozen so Barry held it inside his jacket and massaged the circulation back.

Whitfield looked after the game little radio operator while Barry built a fire and pulled the injured man's chute down. Using the parachute for a shelter, Barry and Whitfield cut pine boughs for a bed. They put Trippodi's chute harness on him and by exerting their last ounce of strength, managed to carry the radio operator up the last 50 feet of cliff and into the shelter.

The remainder of the day Barry and Whitfield had spent gathering wood to last during the night and tried to dry out theirs and Trippodi's soaked clothes. All that afternoon they had heard shouts from across the lake and the next ridge, but they were so weak they did not think their bodies could take going around the lake and back to "Tripp" before dark.

The rain came down harder and this kept them busy taking care of "Tripp" and the fire. So badly soaked was the wood that by 9 P.M. the fire went out completely.

All night long Whitfield and Barry lay on either side of the injured man trying to keep him a little warmer with their bodies. They kept giving him snow to suck on, for he was running a fever and suffering from shock. Barry hesitated giving "Tripp" morphine to ease the pain because they had no way of keeping him warm or helping him. Throughout the miserable night the men kept wiggling their toes to check if they were frozen.

At dawn Whitfield and Barry talked it over and finally decided that the best bet was for both of them to make for the coast. Alone one might slip and break a leg, together they had a good chance of being picked up and bringing back medical aid to "Tripp." Capt. Barry and Lt. Whitfield had reached the ocean around noon.

As the fire the seven survivors built near the shore sent up a column of smoke, they heard sounds of a motor. Everyone fell silent, listening. Then galvanized to action, the survivors set off flares, fired pistols, and shouted. Laughing and congratulating themselves on their good luck, the men tumbled and slid down to the water's very edge. But the boat sailed on and disappeared behind a point.

Fifteen minutes later another vessel appeared and just as suddenly vanished behind a cove. The men's hearts sagged. Neither boat had seen them. The prospect of another night on the uninhabited island was unbearable.

Then, just as hope seemed finally and completely gone, one of the vessels re-appeared around the cove. Everyone shouted and shot off the remaining flares. The little boat answered with her horn. Rescue had come.

The craft was the *"Cape Perry,"* a Canadian fishing boat, but to the seven airmen of the ill-fated B-36 it looked better and more luxurious than the *"Queen Mary!"*

Aboard the fishing boat the survivors gulped coffee with a dash of rum and feasted on all the bacon and eggs they could eat. Captain Vance King, the boat's skipper, and his crew broke out their clothes for the airmen to wear. Better still, three more superbomber crew members, Lt. Cox, Lt. Darrach and Corporal Schuler, were aboard and all right. Although the survivors later gave all the information they could to help in the intensified search for their still missing buddies, five of the crew members were lost forever.

Immediately upon boarding the *"Cape Perry,"* Capt. Barry put through a call on the ship-to-shore telephone and got help for "Tripp." That same day a rescue team from the Canadian destroyer *"Cayuga"* went in and took off the game little radio operator. Another crew member, Lt. Pooler, was also found with a broken ankle. The Air Force men thanked God their judgment had been right.

Relatives and families of the survivors were notified and later the rescued men were flown to McCord Air Force Base, Tacoma, Washington. They were entered at the base hospital, told to sleep themselves out, then go to the mess hall and stock up on all the food they wanted. While at the hospital the men went in to see "Tripp" and to wish him a speedy recovery.

Two days later aboard a C-54 the airmen were on their way back to home field, Carswell Air Force Base, Fort Worth, Texas. Over New Mexico one of the four-motored C-54's engines went out, and to a man every one put on and adjusted his parachute. If they had to jump again, they were ready. Fortunately, however, they didn't have to. The trip proved otherwise uneventful—except the landing. To these U. S. Air Force men who came back, the touch-down at home field was the happiest landing they had ever made!

Jet Stability

In hearings before the Military Subcommittee of the House Appropriations Committee, General Hoyt S. Vandenberg, Chief of Staff, USAF, recently described the advantages of the use of jet fighters in the Korean war.

Said General Vandenberg, "The jet airplane, while it costs more money for fuel, is the most stable bombing platform in the fighter class that we have. It is more stable than the conventional type of plane. In addition to that, while the jet fighter can spend less time over the target, it can get around much faster and cover much more ground. . . .

"The boys who were flying the jets said that they could slow them down and do a more accurate bombing job than with a conventional fighter, that they could see better, and that they could cover more area."

Courtesy "Planes"

Company Plane Pays

(*Continued from page 23*)

and longer lasting job.

3. In many cases it was possible to better educate the field operator of our equipment as to operating limitations, proper servicing, and correct maintenance and overhaul methods, due to the fact that travel time saved allowed more time with our customers.

4. Fuel and oil costs were less than with our company-owned automobiles, and repairs were very low.

5. A two-place plane did limit the use to transportation of personnel only, so was not entirely practical so far as service calls were concerned. If a service man was taken, there was not sufficient room for parts or tools.

Equipped with these answers, our company bought a four-place *Navion* in December, 1947. This airplane really has proved to be a necessary piece of equipment. Due to its speed, range, low cost of operation, payload, flying characteristics and dependability, we found we flew it just twice as much as we did the Culver the first year of operation. The plane has been from coast to coast and border to border in all kinds of weather, and we have made several emergency service calls where the money saved on one call alone represented more than the cost of the airplane.

A typical example was a year ago last spring when a quick thaw in the Northwest was causing severe flood conditions. We received a frantic call from Mountain Tractor Company, Allis-Chalmers tractor dealers at Missoula and Kalispell, Montana, that they needed parts for one of our power control winches operating a bulldozer. This particular bulldozer was used to build and maintain dams, dikes, and control the river and stream flows.

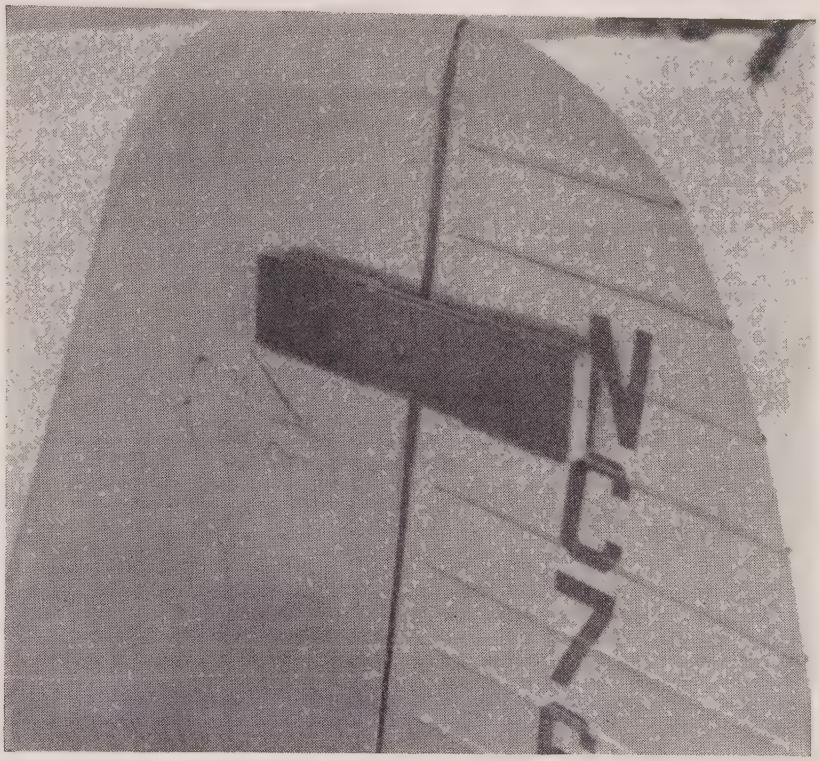
The bulldozer was just about holding its own when one of our winch parts wore out. The entire town where this tractor was working was in danger of being completely flooded and quite possibly washed away if the tractor did not get back into operation that day. It was a case where continuous maintenance on the dikes would contain or control the water, but if they ever broke through in any one spot, the water would be entirely out of control from then on. Thousands of dollars of property were at stake, and probably, many lives.

Van Howell, President of the Mountain Tractor Company, called about 8 one morning, telling us of this particular situation. We loaded the necessary parts into the *Navion* and were winging our way toward Missoula by 10 o'clock.

Our ship has an auxiliary 20-gallon fuel tank so we were able, with favorable winds, to go all the way to Missoula with only one refueling stop at Salt Lake City. The trip took just a little over 8 hours, and by midnight the tractor was back into operation. Tens of thousands of dollars of property were saved by this fast action, all of which certainly represents many times the cost of the plane.

In the matter of cost of operations, the following breakdown of a year's flying of both the *Navion* and the Culver tells an interesting story for prospective company-plane buyers. Remember in this comparison that the *Navion* is a four-placer while the Culver was a two-place job.

WING TIPS . . .



Many a pilot has dished out many a dollar for the repair of an airplane bandied about in the wind. Here is one "precaution" that may help. This easily constructed locking board is quickly slipped over the rudder and vertical fin to provide protection against high-velocity winds and strong gusts for planes tied-down outdoors. The board keeps the rudder from being whipped around by the wind . . . a whipping that often causes costly damage. The locking board consists of two pieces of plywood, each about a foot long, held in place by a through-bolt. Inner surfaces of the board are padded to protect tail. *Bob Blatt*

400 Hours

One Year

Navion

$1392.00	Gas
36.00	Oil
420.00	Hangar
700.00	Insurance
500.00	Repair & Allowance Towards New Engine
$3048.00	

$7.65 Per Hour $.058 Per Mile

$.0145 Per Seat Mile

200 Hours

One Year

Culver

$324.00	Gas
18.00	Oil
240.00	Hangar
200.00	Insurance
100.00	Repair
$882.00	Total

$4.41 Per Hour $.04 Per Mile

$.02 Per Seat Mile

Insurance is also a necessary consideration for the business plane operator. Our insurance costs read this way:

Hull, Ground Coverage ($6,000)	$208.82
PL & PD (PL $100/$300,000 & PD $100,000)	64.91
Passenger Liability ([legal] $100/$300,000)	99.95
Passenger Voluntary Admitted Liability Settlement ($10/$30,000)	210.00
Medical Payments ($2500 for each passenger, including pilot)	47.00
For Pilots Death and Dismemberment ($10,000) and $100 per week	70.00
Total cost per year	$700.78

This Missoula trip was just one instance where our airplane has paid dividends to our customers. There have been many other times. We feel that our company owes this "fastest possible" service to our customers, particularly where the public welfare is concerned. Actual emergencies do not arise very often, but the plane is always ready to go when the occasion presents itself. In cold dollars and cents, it would be hard for us to show an increase in our business that can be attributed directly to the plane, but we can show where time saved en route, actual trip costs, increased territory coverage, prestige and general customer relations have been worth many times this investment. It can do the same for you.

Story of a Stall

(*Continued from page 40*)

which is almost immediately in *most* lightplanes."

"I wish I had known your theories a couple of years ago," I said. "I could have saved a couple of hundred dollars worth of airplane. Maybe you can tell me if the new technique would have saved the day."

"Gladly."

"Well, I was practicing for an airshow comedy act in Miami. I considered myself quite a big shot with a couple of thousand hours. At about 100 feet when I was at the top of a turning pull up, I suddenly felt her let go. I remembered thinking, 'Now I've done it.' I had my car sold for the repairs before I hit the ground. And hit the ground I did. For promptly, per the latest instructions on stall recovery, I popped the nose down, left it there as long as I dared and then eased it up. 'I'm going to make it,' I thought. But no. I felt the plane mushing again into a secondary stall. She clawed at the air, her wings tearing fingernails to hang onto the shred of lift she had regained. But the inertia force of weight bound for the ground loaded her down in the pull out. With a crunch we wiped off the gear, knocked off the ends of the propeller, and after that made a pretty nice landing."

"You certainly could have used the new method," Dr. Rulon and Dr. Brimhall agreed. "We've found that build-up of acceleration is another altitude-losing factor in the old recovery. It loaded the plane down as you mentioned, making even more speed necessary in order to pull out without stalling again. It seems to me that you could have pulled out without even damaging the landing gear."

"We not only found the best way to conserve altitude in stall recovery," Dr. Rulon told me, "but we also found a dual use for the stall warner." I climbed down off the back of my chair where I had gone to demonstrate the accident and prepared to listen. Stall warners were stall warners as far as I could see.

"Do you advocate filling the cockpit with horns and bells then?" I offered helpfully.

"No. Just to use the one stall-warning buzzer or signal to do two things."

That sounded interesting. So far, my one objection to the stall warner on the Piper *Stinson* I was using was that it was so loud every time it went off it blew my hair into my eyes.

"We made experiments to determine the most practical and useful setting of the stall-warning indicator. On holding conferences with manufacturers of stall-warning devices, we learned that there was no definite or consistent recommendation made as to where the warner should be set. One company left the setting up to the owner of the aircraft. Some owners like the warner to go off at the stall—too late to do anything about a stall in some cases. Others like it set with a wide margin of safety—so that it goes off continually and they learn to ignore it. One manufacturer recommended a setting of from 3 to 10 mph above stalling—though did not define what type of stall—and revealed no basic reason for this recommendation other than "this is probably the best place to put the warner."

"We found," Dr. Rulon continued, "that the pilot would derive great benefit if the instrument were set to indicate that he had reached maximum angle of climb. We chose the maximum climb angle rather than the minimum glide because we found the stall from a climb more difficult to recover from (all available power is already on, none is left to help pull out of the stall) and a pilot quite often would like to be able to make a maximum climb in order to clear obstacles on take-off."

"How do you do this, Dr. Rulon?" I asked.

"It is done by setting the instrument at the maximum angle of attack for maximum steepness in a climb. Then, when the signal goes off, the pilot 'brackets.' By 'bracketing the signal', we mean that he raises the nose until the signal sounds, then lowers the nose until it stops, raises the nose again until it sounds, then lowers the nose until it goes off, and so on."

Later on I checked to see how difficult this "bracketing" was and found it very easy.

I asked how much trouble it was to set the instruments and was told that the manufacturers sent along instructions on setting the indicator. But it's best done by a reliable A & E.

A great deal of pains were taken in planning and making the stall tests. A yellow Piper J-3 was used, since it was representative of the planes used at almost every airport. The little plane was kept in perfect condition. This was quite important since the tests were conducted over water at 600 feet.

It was necessary to be over water and at the low altitude in order to obtain accurate readings from the radio altimeter. This instrument had less lag than the sensitive altimeter, though the plane carried both. The instruments included a helicopter airspeed indicator which read as low as 10 mph.

"We had a lot of fun with that," Dr. Rulon told me. "Some of the stalls were made as low as 28 mph!"

An angle-of-attack indicator was mounted on a boom ahead of the left wing. This had to be checked before each flight for two reasons. First, certain stalls caused the vanes to loosen; and second, people visiting the hangar were intrigued by the boom and "tested" it by leaning on it. A battery, new wiring, generator and a free air temp gage were added to complete the plane's equipment.

The test pilots first experimented gingerly with the test of recovery "on the horizon." At first the stalls were tried at approximately 1,000 feet. One pilot was skeptical that recovery could be made in this way and thought it unnecessary to attempt this type of experimentation. The second pilot had had experience in the AF in which certain multi-engine aircraft were recovered from a full stall by the "On Horizon" reference. The first test pilot, needless to say, was soon convinced of the application and use of the "On Horizon" method.

Aside from the main features of learning the "On Horizon" method and the dual use of the stall warner, the pilots found out a lot about stalls.

They found those stalls resulting from a glide the most dangerous of all. Any gliding stall appeared to give very little warning. Both test pilots agreed that the straight-ahead glide stall gave the least warning!

The meanest stall and the one which resisted the "On Horizon" treatment altogether was that from a steep turn. When the pilots said "steep" they meant it—a 60° bank. At 600 feet the pilots fought and swore and finally reported that the stalls were so violent and unpredictable as to prohibit consistent results using the "On Horizon" recovery method.

Therefore, the stall from a steep turn was awarded a category all its own. The pilot's best advice was "stay out of steep-turn stalls" and their next best: "If you do get into such a stall use *optimum* rudder, aileron, elevator, nose below the horizon for 7 or 8 seconds, and don't try to continue the turn." A loss of 90 to 150 feet was average for these *experienced* pilots.

The thousands of stalls the test pilots ran built up valuable data on the new method of stall recovery. There is a word of caution to be said, however. With the exception of dead-stick glides and steep turns, the "On Horizon" method worked on the Piper J-3. On planes that do not have the power available to overcome drag and weight it will still be necessary to use the "Below Horizon" method—though in a modified form.

If you want to do some checking on your own, romp up to a safe altitude and find out how it affects different planes, with gear down, up, flaps, and in different maneuvers before depending on it at a low altitude. This knowledge, which will probably change the flight instruction and flight tests all over the country, must be used wisely. So let's make our experiments high and keep thinking!

ALTITUDE record for lightplanes was set at Miami Air Show by Caro Bayley. She flew *Super Cub* to 30,380 feet

Ridin' the Radio

(*Continued from page 19*)

all its deficiencies, as part of the tools of a complex trade.

Fortunately for us there have been men who, although respecting the splendid service of our navigational radio set-up, have decided to do something about its inadequacies. They recognize that aviation is moving ahead with jet-like speed and electronics must keep pace with it; that such practices like stacking are costly and dangerous; that cancellations lose customers; that the complications of instrument flight ground all but the highly experienced, causing aviation in general to suffer. These men decided that an entirely new system would have to be implemented. One that would be indifferent to all but the worst weather and could meet the demands of intensified air traffic. A system possessing airline accuracy but simple enough to be used and understood by the private pilot. Men dreamed, planned, figured, designed and redesigned, built and rebuilt and at last have fabricated a blueprint of an entire new system of electronic aerial navigation. As yet some of the components of the over-all system are not complete but experimental models have proved their value beyond a doubt.

These men referred to are the members of the Radio Technical Commission for Aeronautics (RCTA), and are composed of representatives from the Army, Navy, Air Force, CAA, the airlines, aircraft manufacturers, private flying groups and aeronautical radio organizations.

Del Rentzel, chairman of the CAB and former president of Aeronautical Radio Inc., in explaining the aims of the RCTA, made the following statements: "The most urgent need of all aviation today—civil and military —is a reliable all-weather navigation and landing system. And the most important news on the aviation horizon is the fact that details have at last been worked out to place such a system in operation.

"Weather delays not only annoy the air traveler but they are a grave source of economic loss to the scheduled air carriers and to the airports from which these carriers operate. In 1946, for example, the loss to the airlines from schedule unreliability was at least 40 million dollars. This sum is almost double the 1947 net loss of all United States airlines.

"But this airline loss is only one phase of a serious situation. The United States already has approximately six billion dollars invested in civil airports. Because of weather these airports are closed about 15 per cent of the time. During these periods, the airports return no benefits to aviation or the public, but the expenses continue. By making full use of our airports, all-weather flying will, for all practical purposes, add almost a billion dollars to our airport values without an additional cent of airport expenditure.

"Another benefit of all-weather aviation cannot be measured directly, but nevertheless is real and important. This benefit is the ability to move key men and material rapidly and certainly to points where they are needed for business and economic reasons. It is true that business today uses aviation to a greater extent than ever before. But continued expansion of this type of use of air transportation is handicapped by the threat of weather delays and cancellations.

"Finally, an all-weather navigation system is needed urgently by our military forces. In time of war or threat of war, large numbers of military aircraft must be moved swiftly and efficiently along congested airways into small and crowded airports. The split-second tempo of another war will brook no delays for weather. There will be no time to improvise and train men in new techniques.

"Our entire existence as a nation may hinge on the efficiency of the airways system actually operating at the outbreak of hostilities."

Because of the RCTA we can, by the end of 1955, reasonably expect to be able to take off in any weather and fly along a course on or off the airways guided by static free VHF omnirange radio. During the flight, we will have a continuous indication on a panel meter of our distance from the range station, while at the same time a needle gives us the magnetic bearing of said station. Within 30 miles of our destination a complete picture of the traffic situation and our place in it will be visually presented to us on our teleran indicator. Stacking will be unheard of. Our flight will be completely controlled by ground traffic controllers equipped with surveillance radar, and computed so as to allot us a specific time for landing at our destination. Once over the omni we will head in to intercept our ILS beam. Here our distance measuring equipment will automatically switch over to indicate our distance from the end of the runway. The landing itself will be made by a combination of ILS and GCA. It may even be done automatically if the aircraft is so equipped. A flight under such a system could be conducted safely with zero-zero conditions existing throughout.

This modern system of electronic navigation revolves around three major devices which, when grouped together, are called the OBD system. OBD stands for omni-bearing-distance. The three devices are the Omnirange (VOR), the Distance Measuring Equipment (DME) and the Parallel Course Computer (PCC).

In order to know our position in space we must determine three things:

1. Distance from a fixed point.
2. Bearing from a fixed point.
3. Vertical distance above sea level (altitude).

The OBD will determine the first two dimensions while the third is supplied to us by our altimeter.

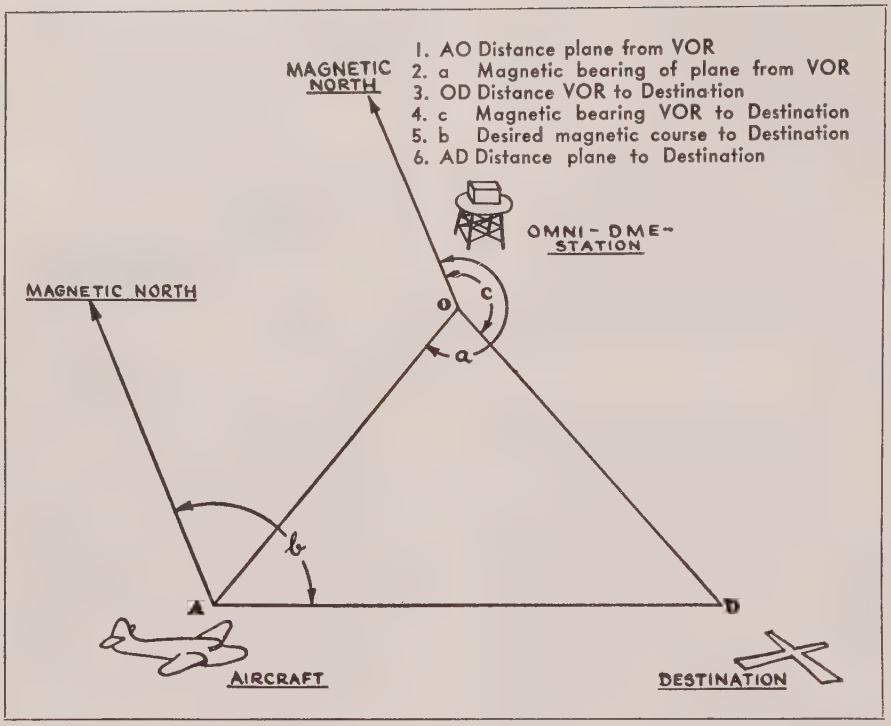
Approximately 300 omniranges are now in operation throughout the country. Four hundred and sixty-five more of these stations are in the planning stage. Although 815 DME units are planned, there are only a few now operating on an experimental basis.

The parallel course computer utilizes the VOR and DME for its operation. It requires no ground installation; all its equipment is airborne. This computer has not advanced to the point where it is ready for manufacture.

In order to clarify the proposed radio set-up, we have summarized below in non-technical language the operation and purpose of the three OBD components.

OMNIRANGE—Signals are sent out by a

(*Continued on page 46*)



Ridin' the Radio

(*Continued from page 45*)

conventional transmitter having a 200-watt output at a specific frequency in the 108-to-118 megacycle range. This transmitter feeds five antennas arranged with four of them in a square and the fifth in the center of the square. All five antennas are enclosed in a non-metallic shelter set atop a 15-foot tower. In order to insure proper radiation, the antenna tower and transmitter are set within a large clearing with a minimum of 700 feet from trees or buildings.

The center antenna radiates a reference signal of constant phase and is also used for 1020-cycle station-identification signals and voice transmission. A rotating signal of variable phase is sent out from the other four antennas. The phase of the rotating signal varies with respect to the azimuth of rotation. Both the reference and the variable signals are picked up on the receiver which electronically measures the phase difference between them and computes the azimuth of the omni leg being received. When the vertical needle of the Cross-Pointer Indicator is centered, the azimuth reading is shown on an instrument called the Course Selector.

By this method, approaches to the station can be made from any angle. The pilot by means of his Course Selector has a choice of any beam of the omni from zero to 360° by which he may navigate to the station.

OPERATION—1. Tune in station; identify it.

2. Turn Course Selector knob (knob "A") to the desired course "To" the station. (If lost without any idea of the direction to the station, rotate Course Selector knob until vertical needle of Cross-Pointer Indicator centers itself and the "To-From" indicator reads "To." At this moment you are on the leg of the omnirange which coincides with your course indicator reading. This tells you your heading "To" the station.)

3. Note position of vertical Cross-Pointer Indicator and turn into the direction in which it is displaced (the CPI needle always is displaced toward the track). Hold this course until the needle swings to the center.

4. You are now on course. Keep the needle centered until the "To-From" needle swings to "From." This says in effect that you have just passed over the station. This indication, however, is not precise enough for pin-point navigation due to the wide cone of silence on the VOR. It should be used strictly as a marker.

5. If you intend to fly away from the station, simply hold the heading which took you to the station. The "To-From" needle will now be pointing to "From."

6. If, after passing the station, you desire to make a procedure turn and head toward the station as, for instance, in an instrument approach, turn knob "B" on the Course Selector so that your Cross-Pointer Indicator will read the reciprocal of your inbound course and the needle will rest on "To." If the system were not equipped with this "B" knob, the Cross-Pointer Indicator would give opposite indications just as the ILS localizer needle does after passing over the localizer transmitter.

INSTRUMENTATION—The standard omni version which has been accepted by the Air Force, Navy and Airlines has three instruments: 1—Course Selector 2—Cross-Pointer Indicator 3—Radio Magnetic Indicator (RMI).

The operation of the first two instruments already has been discussed. The third instrument, the RMI, is a standard-sized instrument with two needles pivoted at the center of an azimuth scale. This scale is slaved to the magnetic or flux gate compass causing it to rotate so that the magnetic heading of the aircraft can always be read directly. This in turn causes the needle which points to the omni station to be read in magnetic degrees. The other needle is optional but can be used advantageously for a conventional ADF pointer.

DISTANCE MEASURING EQUIPMENT—DME is a radar system in which an airborne interrogation unit sends out pairs of high-frequency pulses (somewhere between 960 and 1215 megacycles) to a ground receiver-transmitter combination called a transponder. When the pulses are received and identified by the transponder, this same transponder is automatically triggered into radiating a return pair which is picked up by the airborne receiver. This receiver electronically computes the time between the emission of the signal and its return, and converts this time into a distance reading to the nearest tenth of a mile. A Veeder counter-type meter, similar to an automobile mileage indicator, furnishes the reading. The indicator reading is continuous. It is comparatively easy to compute the distance if the pulse time delay (elapsed time for one out-and-back pulse cycle) is known, since the speed of the signal is a constant (186,000 mi/sec). The formula resolves into Distance—

$$\frac{\text{Time Delay} \times 186{,}000}{2}$$

PARALLEL COURSE COMPUTER—This is an airborne device utilizing radiations from the VOR-DME (no additional ground installation necessary) which enables the pilot to fly an off-airway course, yet be guided by the omnirange on the airway. This will be a definite boon to off-the-beaten-track airfields. With PCC, radio navigation to any airport within the radiation pattern of an omni station will be as accurate as if the VOR were at that airport.

Actually the computer solves a trigonometric problem (*see drawing upper left*) in which the bearing and distance of the destination are the unknown side of a triangle. In order to determine this unknown side, five quantities are fed into the PCC. Three of these five factors are constant and are set by the pilot:

1. Desired magnetic course to destination.
2. Bearing from omni to destination.
3. Distance from omni to destination.

The remaining two functions vary with respect to the position of the aircraft, and are electronically fed into the computer by the VOR and DME equipment. They are:

1. Bearing of the aircraft from the VOR.
2. Distance of the aircraft from the VOR.

The electromagnetic brain of the PCC accepts this information, transforms it into electrical impulses and comes out with an immediate answer in track guidance through the indications of the vertical Cross-Pointer needle and distance readings on the DME.

To operate the PCC the pilot sets:

1. Desired magnetic course to destination.
2. Magnetic bearing VOR to destination.
3. Distance from VOR to destination. The pilot then tunes in the proper omni station, identifies it and switches the course deviation indicator to computer. The pilot then follows the CPI needle to his destination. Distance of aircraft from destination is continuously shown on the DME indicator.

If the pilot desires to fly to the right or left of his course, say 10 miles, he off-sets a track selector knob 10 miles in the desired direction and follows the vertical needle. Naturally then, his destination will be displaced 10 miles.

All pilots have much to look forward to in the next five years. The increase in safety and efficiency will do much to keep the pace of the U. S. in world aviation.

MILITARY AVIATION

New B-36F

The new B-36 is no bigger but it is a lot more powerful. Designated B-36F, this version of the USAF's strategic bomber is powered by six 3800-hp piston engines and four jet engines mounted in pairs in pods beneath the outer wing panels. The 3800-hp piston engine is a new one developed by Pratt and Whitney Aircraft, and is designated R-4360-53. The B-36F currently is undergoing flight tests at the Fort Worth Division of Consolidated Vultee Aircraft Corporation.

Russian Fighters

The U. N. Forces in Korea know all about the Russian MIG-15 jet fighter. U.S. Forces in Europe know all about it, too. According to a report from Germany, large numbers of MIG-15's, IL-10's (ground-support plane), LA-9's and 11's (fighter) and TU-2's (attack bomber) have been seen flying over Berlin. All are stationed at Soviet bases just outside the city.

Air Conditioner for Jets

Hamilton Standard division of United Aircraft Corporation has developed a new and larger version of its air-conditioning unit for jet fighter cockpits. The unit bleeds hot air from the jet plane's engine and delivers either hot or cold air to the cockpit at a rate of 310 cubic feet a minute. Temperature of the air is automatically controlled by a thermostat in the cockpit set by the pilot. The air supply can range in temperature from 25° to 400°. The first of a substantial order for the unit has been shipped to Lockheed for installation in its F-94C fighter for the Air Force.

Naval Air Growth

At the end of fiscal year 1951, the Navy will have 7,312 aircraft in active service. This compares with 6,537 aircraft in active service as of October 1, 1950. The Navy also is expanding its air technical training program. The training center at Jacksonville NAS is being reopened, and the training center at Memphis is being expanded. When these schools reach operating strength, they will be staffed by nearly 100 officers and 1800 men who will train a planned input of almost 1,000 men a month.

Collier Trophy

Winner of this year's Collier Trophy was well-known airman Bill Lear. He was named winner for his "outstanding achievement in the development, perfection and application and production of the Lear F-5 Automatic Pilot and Automatic Approach Control Coupler System which makes possible the safe landing of jet aircraft regardless of extreme weather or visibility conditions."

News Notes

GLENN L. MARTIN COMPANY has established a Design Development Department in the Engineering Division. The new department will be headed by G. S. Trimble, Jr., former chief of the Aerodynamics Department.

HILLER HELICOPTERS has been awarded a Navy contract for the development of an unusual and simplified jet powerplant for rotary wing aircraft.

LOCKHEED AIRCRAFT sales for 1950 will reach approximately $170,000,000 when the corporation's fiscal-year books are closed.

TEMCO recently completed modification of a DC-4 developed specifically to permit the rapid evacuation of sick and wounded military personnel from overseas bases. Designated C-54M, the prototype is presently being reviewed by high government officials and ranking officers of the armed services.

DOUGLAS AIRCRAFT has announced the awarding of the French Legion of Honor to Donald W. Douglas "as a token of gratitude for the eminent service rendered to the progress of aeronautical science and to the case of Franco-American friendship." Presentation of the award was made by Brig. Gen. Jacques-Louis Murtin, air attaché of the French Embassy.

LEAR, INC., of Grand Rapids, Mich., has been awarded an additional contract for the company's F-5 autopilots for the Air Force. Contracts now total more than $8 million.

ALLISON DIVISION of General Motors has received a Navy contract for more than 300 T-40 5500-hp turboprop engines. The engines are to be installed in the Douglas A2D and a few in the Consolidated Vultee R3Y flying boat transport.

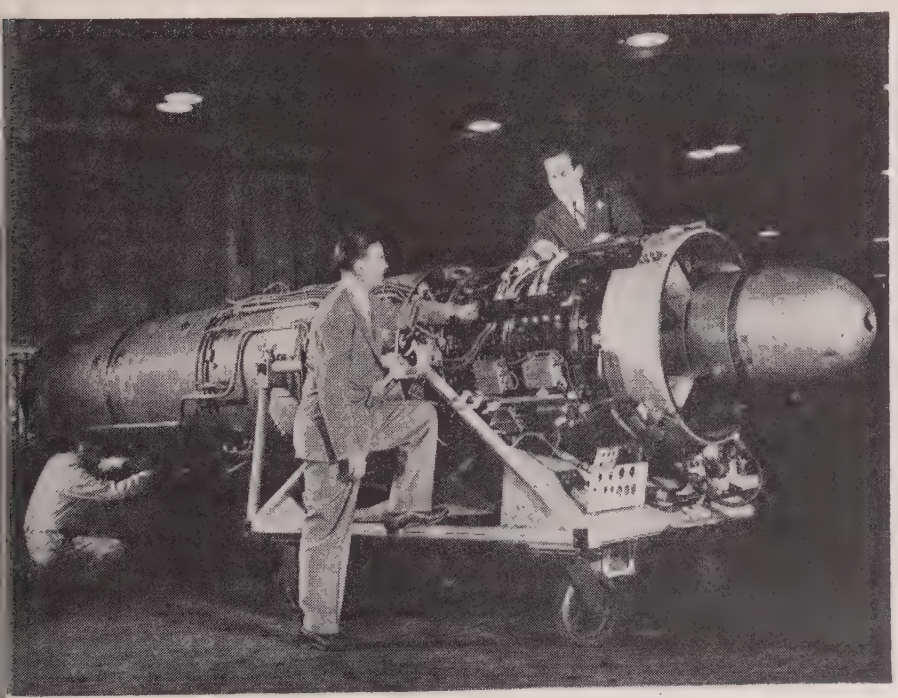
NORTH AMERICAN AVIATION is said to be building its first turboprop plane, a new and heavier version of the AJ attack bomber.

LINK AVIATION has received a letter of intent from the USAF for building trainers simulating the B-47B. Deliveries are scheduled for late 1951, with contract value set at $2 million.

McDONNELL AIRCRAFT has demonstrated its "Little Henry" ramjet helicopter to military officials and pilot trainees at the USAF's 'copter school at Connolly AFB, Texas. "Little Henry" showed off its ability to hover, its slow forward and backward flight, etc.

CHEVALIER—Recently Donald Douglas was made a Chevalier of French Legion of Honor. Award was made by Gen. J-L. Murtin

GENERAL ELECTRIC J-47-GE-17 is the first U.S. jet engine to incorporate major reductions in strategic materials. This engine is equipped with afterburner; will be used to power F-86D



(*Continued from page 11*)

have new transports on order by the airlines sandwiched in the same production line as those being produced for the armed forces. I am sure, therefore, that little trouble will be experienced in obtaining necessary replacement parts for airlines, although the precise mechanism must be determined by NPA. In the present stage, they have tried to confine authority for issuing Defense Order ratings to the armed forces and the Atomic Energy Commission, fearing that if the dikes were opened to civilian D.O.'s, the whole system would be swamped.

The NPA has approached the problem of maintenance of an efficient civil aviation with an entirely sympathetic attitude and has, through agreement reached with the Department of Commerce and the CAB, embarked on a course of action which we feel will insure that no American civil air carrier will be required to discontinue operations due to lack of availability of any transport aircraft or replacement parts.

The Department of Commerce has designated the CAA as the claimant agency for submitting to the NPA requests for issuance of directives as necessary to the suppliers, approving the production and delivery of necessary items. The CAA and the CAB also have been instructed to study various plans which will permit joint planning with the military for programming aircraft and spare parts production so that in allocation to military and civil users the essential requirements of the civil users are satisfied. This also will cover the requirements of the air carriers for electronic equipment.

Specifically, the Chairman of the CAB will serve as a claimant agency before the Secretary of Commerce with respect to "all aircraft used in air carrier transportation and the use thereof;" and the Administrator of Civil Aeronautics will serve as a claimant agency "for all civil aviation operations not assigned the CAB. These will include materials, parts and equipment for all civil aircraft and for aeronautical communications facilities."

In general, the distinction drawn as between the CAB and the CAA is that the CAB will serve as claimant agency for "whole" transport-type aircraft which are used by scheduled and large non-scheduled civil air carriers, and the CAA will serve as claimant agency for all other whole civil aircraft; all spare parts and maintenance suppliers, or materials needed by scheduled and non-scheduled operations, fixed-base operations, executive-airplane operations, private flying, etc., and for materials and supplies needed by all other segments of civil aviation not directly connected with flight operations.

We realize that the terms of reference as included in the Departmental Order setting up the procedure are necessarily so broad that there will be some borderline questions as to whether the CAA or the CAB serves as claimant agency in a given instance. Such questions will be resolved on an individual case basis.

This problem of insuring that the essential "materials" requirements of the civil-aviation economy are met at the same time production schedules for "materials" needed by military aviation are met divides into two extremely important timing phases.

The tremendous expansion in military aviation requirements, for not only new planes but also for spare parts and maintenance supplies, has resulted in large backlogs in available aviation industry productive capacity. However, the fact is that the entire plant production requirements necessary to keep the civilian aviation economy in good repair and meeting the essential demands placed upon it, amount to less than 5 per cent of the present "material" requirements of the military. In order that the civilian aviation industry and economy will not be unnecessarily damaged during this period when the tremendous military backlogs are being taken care of, an interim program and a long-range program have been worked out with the National Production Authority.

The interim program, which is being placed into operation immediately, and procedures to be followed by CAA in connection therewith, are: The NPA has decided that the expediting of "materials" requirements for civil aviation will be done, when appropriate, through a device known as a "Directive." Directives will be issued on a specific-case basis, to a specific supplier of a "material" which is in short supply, to meet a given emergency. A directive will be issued to the supplier who is in actual control of the "material" in short supply, and the force and effect of a directive, unlike a rating, cannot be extended. Directives as presently issued, therefore, cannot be used on a broad industry basis, but must be used only to meet specific critical shortages.

In general, all persons and operational groups of limited scope who wish to request an NPA directive for which the CAA serves as a claimant agency will make their initial request for action to the appropriate CAA Regional Office.

Each CAA region has the following responsibilities and will take the following actions in connection therewith: insure that each prospective claimant takes every action possible to secure through his own efforts and, in some way other than through requesting an NPA Directive, the material in short supply; provide such advice and assistance as can reasonably be given to the prospective claimant in his efforts to secure such material; screen any requests for Directives which are finally submitted, to insure that all the pertinent information is included, and that

New Ground-Support Fighter

Infantry-engineers, on a training mission, got a preview of things to come when the Air Force's newest swept-wing fighter, the Republic F-84E *Thunderjet,* passed overhead during flight tests. The fighter carries 1,000-pound bombs and several five-inch rockets for a simulated attack on enemy positions. The F-84E is in service in Korea.

the request is in sufficient detail to permit NPA to objectively review the request and act on it, if approved; and forward the requests for Directives to the CAA in Washington for necessary action.

Complete details as to the methods of implementing this program have been forwarded to the Regional Offices where they may be studied by all interested industry groups.

Our Aviation Development Advisory Committee, in its report on "America's Civil Air Power," has stressed the great variety of contributions which non-airline flying makes to our national defense and welfare, and CAA intends to see that such services are continued to the fullest possible extent. We know, for example, that food is a weapon, and that the 5,000 planes doing agricultural flying conserve hundreds of millions of dollars worth of crops. We know that the more than 2,000 flight and ground schools may be needed for training purposes if the armed forces' air personnel requirements increase greatly. We know that the use of small planes for pipe-line patrol, ambulance service, and countless other utilitarian purposes has a place in a defense economy just as much as in peacetime.

I don't believe operators of small aircraft have as yet felt any severe pinch from parts shortages, and we are hoping that through the procedures outlined we can keep such a situation from developing.

We are going forward, too, with a system of identification cards for all airmen holding CAA certificates. Some time soon, the exact date hinging on printing schedules, it will be possible to obtain from our Aviation Safety field offices a form on which to apply for an identification card. The procedure will be entirely voluntary, but the airman who obtains his card now will be protected against temporary grounding should a worsening of the world situation require us to make such cards mandatory.

We have worked closely with the appropriate security agencies in developing the identification card procedure, and believe it represents the common-sense minimum to meet security requirements. To obtain a card, airmen will fill out the application—only one copy, believe it or not—including signature of a non-subversive statement, and accompany it with documentary proof of identification, citizenship, place and date of birth, plus two small photographs. A fingerprint will be placed on the application, and also on the card. Complete details will be announced in ample time for all interested airmen to make application.

In addition to assuring that our civil aircraft can be kept airworthy, and that our civil airmen are trustworthy, it is necessary to examine the readiness of our civil airports. Some of you may remember the frantic efforts from 1940 on to build landing areas for defense use, and the taking over of many civil airports by the armed forces. Then in 1945 we had to go into reverse gear and transfer to local control airports which the military no longer needed. Many problems arose about the cost of restoration of the fields for civil use.

Today, we are trying to anticipate and avoid these complications, and get our airport system in shape for any demands which may be made upon it. Generally speaking, we have an adequate *number* of airports for the needs both of the military and the air carriers in an emergency. A study made jointly by CAA, Air Force, and Navy shows, however, that approximately 75 per cent of the airports in the mobilization plan are deficient in runway lengths for military use, while others are inadequate in strength or other respects.

The question arises, "Who is to pay for construction of the additional facilities required, who is to build them, who is to maintain them?" We also face the problem of military use of existing facilities. If the military wishes to move into a civil airport, whether it be one turned back after the last war, or one with an entirely civilian history, what is the best arrangement for operating that airport for joint civil-military use?

To find the best answers to these questions, and to get a program of action under way, CAA is participating actively in the work of an airport task group of the National Security Resources Board. The task group is surveying a dozen representative locations.

To our defense planning on airports, airmen, and aircraft must be added the very important work being done on our airways system, to help identify friendly flights for the guidance of the air defenders of the United States.

Since last March, we have encouraged the filing of flight plans by all pilots entering specified air-defense zones. These eight zones ring most of our border, from Norfolk, Virginia, north to Canada, across to the Pacific with one gap, then south to Mexico. In addition they extend for 150 miles around the atomic installations of Los Alamos, Hanford, and Oak Ridge. The immediate areas surrounding these three atomic plants are, of course, prohibited areas, out-of-bounds for all air traffic. Pilots violating these prohibited areas are subject to heavy penalties.

But in the air-defense zones, we have depended on a system of voluntary cooperation from pilots to enable us to supply information to military radar centers. We have asked pilots planning to enter these zones to file a flight plan (*now mandatory . . .* see page 5), even if they are traveling under VFR, when it is not required. Our traffic control centers and communications stations transmit this information to Air Defense Command, which receives similar information on military planes from Military Flight Service operations offices. Then, when the plane shows up as a pip on the military radar screen, it can be identified as friendly. Otherwise, interceptors must be sent up.

As a further improvement on present procedures, CAA has been asked to set up Aircraft Movement Identification Sections which will filter and sequence the information now flowing to military radar from many different sources. We are going to do this experimentally in Boston and Seattle, and if it works out successfully, in all defense zones.

We have had excellent cooperation from pilots in this voluntary program of filing flight plans, for which the CAA is very grateful. You can see, however, how important it is that we give our air defenders 100

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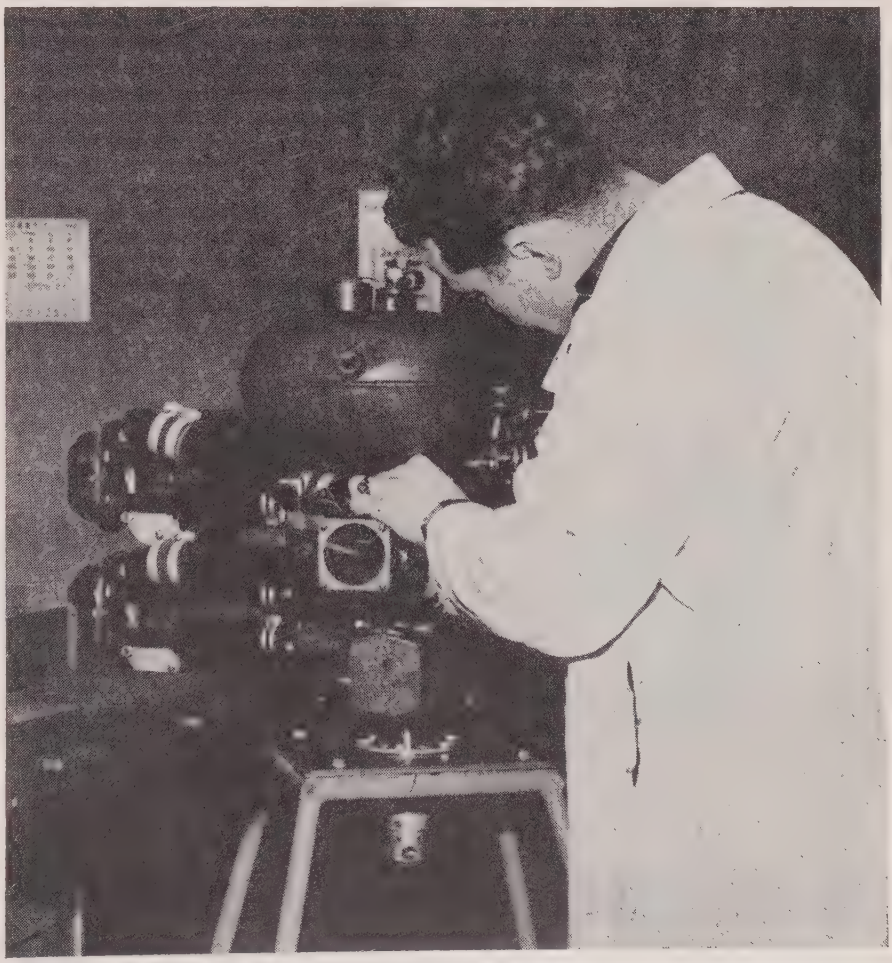

MATERIALS in short supply and essential to maintenance of civil aircraft will be procured through NPA Directives via CAA regional offices. The CAA is to serve as claimant agency

Tricycle-Gear Cub

(*Continued from page 15*)

tried a few à la Ercoupe landings, the let 'er drift kind. It worked fine. We set the ship down on its main gear, eased forward on the nose wheel and it lined up straight down the runway.

Many small but significant changes have been made in the 1951 *Pacer*, and these improvements have been incorporated in the *Tri-Pacer* as well. Most of the changes have been the result of a questionnaire Piper Aircraft sent out to its 1950 *Pacer* customers, 50 per cent of whom were businessmen. Information was requested on all operations: cruise, range, average gas consumption, etc. Of the 42 changes deemed desirable by the customers, Piper eliminated the so-called "sublime and ridiculous" and made 26 improvements.

One of the most important improvements is in the finish of the Piper airplanes. Duraclad plastic is now used. This process includes the application of butyrate dope to the fabric and of enamel to the metal parts. The Duraclad plastic is not only fire-resistant but it doubles the life of the fabric and retains an over-all shine.

They've cleaned up the struts and fuselage, faired the gear, streamlined the gas caps and made the door a push-button type. This "cleaning up" has added about 4 mph to the ship's cruising speed—at 2500 rpm, 22 inches manifold pressure, at 5,000 feet, the *Tri-Pacer* "135" gives a neat 130 mph. This is on 75 per cent of power.

Other added niceties in the new model *Pacers* include a no-sunburn ultra-violet Plexiglas, new interior upholstery, additional Fiberglas sound-proofing and an auto-type sound-deadener inside the fuselage cowling and on the firewall, easier access to the baggage compartment behind the back seat, a roomier cabin, and ash trays.

For those who fly right on through the winter, there is a more powerful battery to aid cold-weather starting. And thanks to an extra lead-off, the cabin heat has been upped almost 100 per cent. The Custom *Pacer* has a rear-seat heater, too.

For summer flying, there's a panel control that permits cool air to flow into the cabin at an angle that affords better cool-air distribution throughout the plane. In the new 1951 *Pacers* you'll be warmer in winter and a lot cooler in summer, all of which means greater pilot and passenger comfort.

The fuel system on the *Pacer* has been revised to permit using both gas tanks. Both the *Pacer* and *Tri-Pacer* are now equipped with front and rear feed.

Instead of having to rely on outside fuel gages, the pilot of a 1951 *Pacer* has electrical fuel gages on the instrument panel. The gas tank selector switch is recessed under the panel, and the pointers on the selector are bright red and point at the tank being used.

One item of optional equipment (for $16) that is sure to appeal to many a flyer is the Piper-manufactured shoulder straps for extra safety. These straps are anchored to the bottom of the front seat and are for both pilot and passenger. Shoulder straps for the rear seat are anchored to a fuselage strut, the streamline tube at the top of the back seat.

Just about every type of radio equipment on today's market can be installed in the new *Pacer*. On the Custom PA-20 "125" that I flew there was a Lear ADF and a Bendix radio with a built-in loop.

With an eye to utility, Piper engineers have designed the cabin of the *Pacer* so that the rear seat can be removed and that area, 36 cubic feet, used for cargo. Another adaptation permits the *Pacer* to be used as an emergency air-ambulance. The right front seat goes down and space is provided for a straight litter or a hammock that can be rigged up in just three minutes. Since the rear seat can be left in, the space is there for either a doctor or nurse to accompany the patient.

Another production special coming off the assembly line at Piper Aircraft is the PA-18 *Super Cub* powered by a Lycoming 125-hp engine. The standard PA-18 has a 90-hp Continental in the nose.

With an empty weight of 845 pounds, the *Super Cub* "125" is a small airplane that can carry more than its empty weight. And with that load it can still climb at 1,000 fpm, and cruise at 110 mph. With a light load it can slow-fly (with flaps) at a mere 33 mph, or 38 mph with a full load.

The new provisions in Part 8 of CAR permit overloading an airplane for specific purposes, *i.e.* crop dusting, spraying, seeding, or even tuna fishing on floats. The regulation leaves the amount of overload to the pilot's discretion. With its general structure-stress of 3.6 to 1, the *Super Cub* "125" can haul 1500 pounds at a red-line airspeed of 110 mph, and if the stick were to be hauled back

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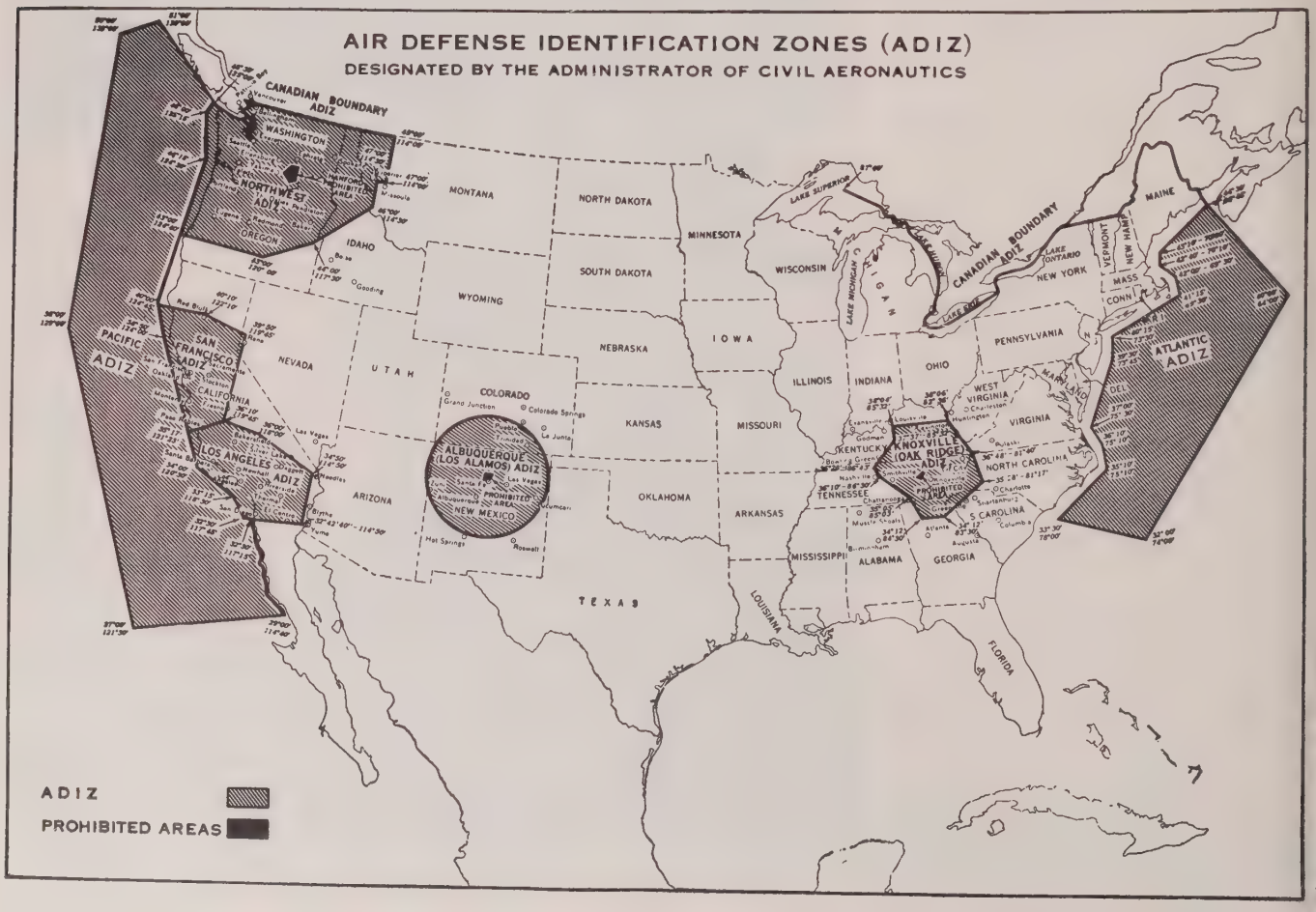
MAP shows areas where filing of flight plan is now on mandatory basis, not voluntary. New regulation *(see page 5)* affects pilots



Dilbert

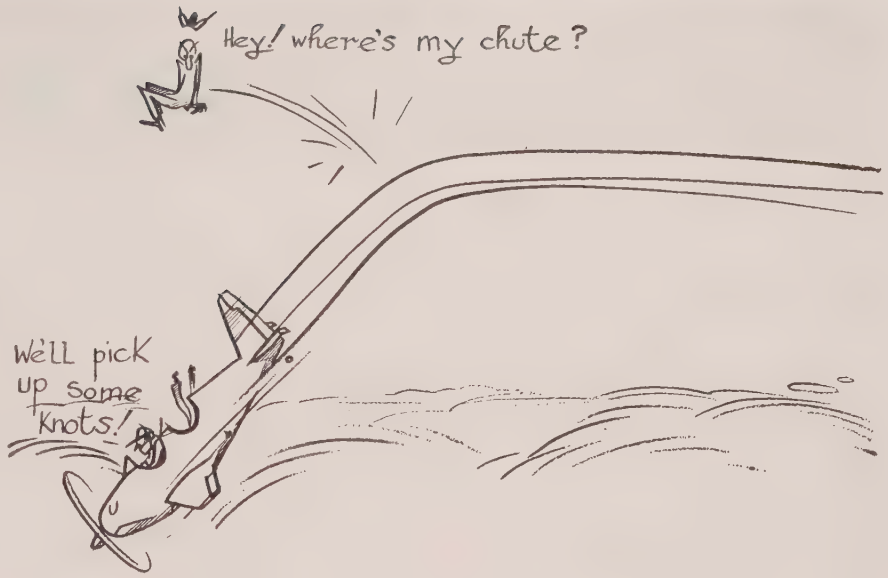
(*Continued from page 33*)

novice; he had over 500 hours, but it was all in single-engine planes.

When the airplane commenced to swerve, the student, not having rudder control, attempted to check it with throttle. He overcorrected, however, and started turning the opposite way. Again he added opposite throttle and started swinging back the other way. (Don't ask about brakes; nothing was said about them in the report.)

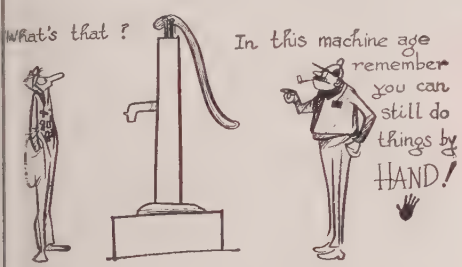
Not until they were headed for a ditch doing approximately 65, did the instructor take over. He staggered the plane across the ditch, but scraped a wing. This caused the plane to cartwheel to a sudden stop, where it caught fire.

Both the instructor and student escaped injury. Physical injury, that is—the instructor received a terrific mental beating from his boss.



Quick Dilbert—The Hand Pump!—The hydraulic system functioned normally during the approach and landing. Wheels and flaps were lowered without difficulty. The brakes slowed the cargo plane to taxi speed. You would think a guy could begin to relax about then, but an airplane flight is never over until the plane is in the chocks—and with engine cut.

Shortly after Dilbert applied brakes to turn into the parking area, they failed completely. Frantically, he pumped his brakes, pulled back on the yoke, and fanned his rudder; all accompanied by a rising crescendo of oaths. But nothing helped. He did collect his wits enough to cut the switch just before he hit the line. Three planes were damaged in the ensuing collision.



Granted this accident was caused entirely by a material failure. The point I'm trying to make is that it still need not have happened. Had Dilbert really been sharp, he would have tried the hand pump when the brakes failed. He had sufficient time.

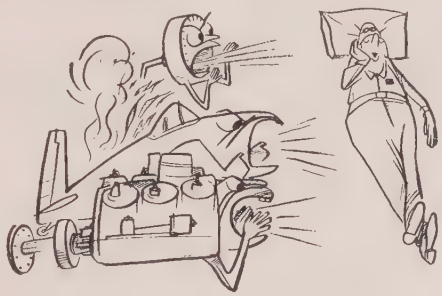
Investigation disclosed a leak in the hydraulic system. Most of the fluid was gone, but a few strokes of the hand pump built up sufficient pressure to operate the brakes. Had these few strokes been made in time, it would have prevented a $2,964.32 repair bill.

Educate Your Senses—Do you understand your airplane? Do you understand the signals it continually tries to send to you?

These signals are a sort of sign language which you must receive through your various senses. In the air, your very existence depends on the correct interpretation of these signals—and then knowing what to do about them.

Thus, it behooves you to have your senses highly trained, and to be alert. Here are a few of the things involved:

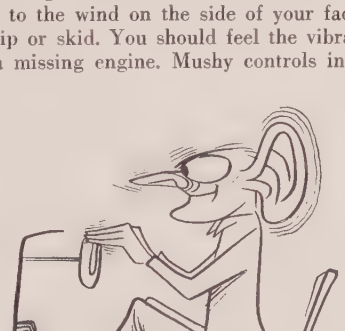
Hearing—Listen to what your engine says. Use your ears to detect erratic operation or laboring. Hear the beginning of trouble rather than the end.



Smelling—Let your nose warn you against fuel leaks, engine fumes, fire.

Seeing—Put your eyes on a swivel neck to guard against all dangers. Train them constantly to watch the terrain and the instrument panel. Learn to focus them accurately for happy landings.

Feeling—This is the sense of touch. It refers to the wind on the side of your face in a slip or skid. You should feel the vibration of a missing engine. Mushy controls inform



you that you are losing flying speed. Changes in pressure on the body tell of changes in direction or speed. This sense of touch, combined with equilibrium, forms a sort of "sixth" sense, highly developed in all "smooth" flyers.

Note that only the *taste* sense is missing. Be assured, however, if you fail to remain alert and use your other four senses, you will end up, pardon the expression, with a bad taste in your mouth. Aviation doesn't forgive carelessness, incapacity, or neglect!

The Disappearing Student Trick—This is a variation of the famous Indian rope trick. It is used by students to baffle their instructors; and it does, too! The following example is one of the methods in vogue.

Prior to take-off, the instructor cautions his student to keep his safety belt fastened. Sometime during the flight, the sleeve of the student's flight jacket inadvertently catches in the latch of the safety belt, and trips it.

On the next abrupt acrobatic maneuver, the student succeeds in catapulting himself into space. He parachutes safely to earth, leaving the bewildered instructor to regain control of the airplane, and return and report the disappearance of his student.

Neglecting to fasten the safety belt in the first place, or failure to latch it properly, are two other popular methods of obtaining the same results.

SETH'S SAFETY QUIZ

1. Ground checking of magnetos should be made with the propeller pitch control set in what position?
2. If cleared on VFR flight plan and flight is completed without incident, is it necessary to file a notification of arrival?
3. When pulling a prop through by hand prior to starting an engine, in which direction should it be rotated?

(Answers below)

ANSWERS

1. Low pitch for two position and variable pitch propellers; take-off rpm for constant speed props.
2. Yes. If a flight plan has been filed, *always* file an arrival notice. Otherwise they will start looking for a lost pilot.
3. Always in the direction of normal rotation, to clear oil from the intake pipes.

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LIST YOUR AIRPLANE with Airmart Aircraft, 1930 W. State St., Chicago, Illinois. We have buyers for all types of used aircraft. No charge for listing. Send complete information.

WILL TRADE new 1951 Massey-Harris Combine for used Stinson. Must be reasonable. Also need Super Cub if you need a new Combine. Write: Burney Bros. Impl. Co., Hemingford, Nebraska.

USED PLANES FOR SALE

FOR SALE AND ALSO WANTED — Used Aircraft; free listing. Lenard Aircraft, 505 Fifth Avenue, New York.

AERONCA

AERONCA CHIEF manufactured 1946. Has 1948 85 hp. engine. Relicensed to May 1951. Fabric is in perfect condition and it always has been hangared. 600 hours total . . . 120 on new engine. $850. Airmart Aircraft, 1930 W. State St., Chicago, Illinois.

BEECHCRAFT

BONANZAS: 16 available. Model 35, #2270VS, has 200 hours. Gyro. Excellent. $6250. Also: new painted 1950, B-35, #8144AS, with 10 hours ferry. Two radios, one VHF. Propeller governor. Evaporative air conditioner. Pitot heater. $13,500. Offer wanted. Apply, POWERS & GEORGE, Aircraft Brokers, 475 Fifth Avenue, New York City; or, 505 North Ervay, Dallas, Texas.

BELLANCA

CRUISAIRS: 18 from $2770. November 1946, #89874S, has 275 hours. Improved cylinders. Electric fuel pump. Aeromatic. Landing lights. Primary blind. Radio. Loop. August license. Will deliver. Clean. $3000. Also: 1949, #6816NS, with 65 hours. Deluxe equipment. Stainless mufflers. New. $4500. Inquire, POWERS & GEORGE, Aircraft Brokers, 475 Fifth Avenue, New York City; or, 505 North Ervay, Dallas, Texas.

CESSNA

170'S: 13 from $3.000. June 1948, #2876VS, has 150 hours. Metal propeller. Radio. $3300. Also, 1949 metal-wing, #9374AS, with 130 hours. Metal propeller. Primary blind. Radio. New. $5200. Consult POWERS & GEORGE, Aircraft Brokers, 475 Fifth Avenue, New York City; or, 505 North Ervay, Dallas, Texas.

195'S: 5 from $8700. October 1947, #4676NS, has 495 hours, engine 123 since overhauled. Gyros. Flare installation. Cabin heater. Relicensed August. $9750. Make offer. Apply, POWERS & GEORGE, Aircraft Brokers, 475 Fifth Avenue, New York City; or, 505 North Ervay, Dallas, Texas.

CESSNA 195—manufactured December 1947. Will relicense at time of sale. Has 800 hours total—200 hours since top. Equipped with blind group, G.E. M.H.F.—Bendix A.D.F.—Narco V.H.F. Painted blue and silver . . . perfect condition . . . Price $9,735. Airmart Aircraft, 1930 W. State St., Chicago, Illinois.

DOUGLAS

A-26'S: 3 from $53,500. Executive, #60937S, has 78 total hours. Hydromatics. 2600 mile range. Crew, 7 chairs, and 3 divans. Lavatory. Baggage compartment. Oxygen. Best instrumentation and radio. Plush throughout. 2 spare engines. $110,000. Inquire, POWERS & GEORGE, Aircraft Brokers, 475 Fifth Avenue, New York City; or, 505 North Ervay, Dallas, Texas.

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ERCOUPE 1946—324 hours total A&E. Halicrafter 2-way radio, directional gyro, turn and bank, sensitive altimeter, nav lights, trim tabs on wings. 75 HP. Relicensed to May 1951. Excellent condition. Price $1,200. Airmart Aircraft, 1930 W. State St., Chicago, Illinois.

FAIRCHILD

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(Continued on page 54)

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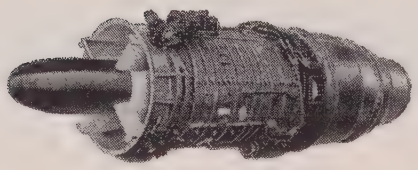

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Korea Causes AF Build-Up

International emergency brings about broad program of expansion of AF and air industry

By J. A. McCONE, Under Secy., Air Force

JOHN A. MC CONE, Under Secretary of the Air Force, is in charge of industrial mobilization, one of the country's key jobs. He was formerly a member of the President's Air Policy Commission (Finletter)

AIR FORCE expansion to 84 groups within next 18 to 24 months has resulted in expansion of aircraft production plans. This in turn calls for increased employment of men and women in factories devoting facilities to meet the current war demands

The United States Air Force is currently engaged in a broad program of rapid expansion exceeded only by that which followed the beginning of World War II.

While events in Korea are responsible for a part of our current expansion program, an even greater build-up is necessary as a result of the entire international situation. The public was made fully aware of the gravity of this situation in December when the President declared a state of national emergency.

Because of changing world conditions, the limits of this program of expansion are still undetermined. It may be said, however, that the Air Force will expand to substantially more than 84 groups within the next 18 to 24 months.

Concurrently with this increase in size, the Air Force is engaged in a four-fold expansion of its mobilization base to permit a rapid second doubling in size and strength should it become necessary.

This means that we are increasing our integral and industrial potential above that required for current expansion. Air bases and training facilities are being constructed, reactivated and expanded over and above our current planned increase in size and strength.

Our industrial mobilization base is being broadened and dispersed by bringing non-aviation manufacturers into the Air Force production picture; by expanding the productive capacity of present aviation manufacturers; and by reactivating idle airframe and engine plants.

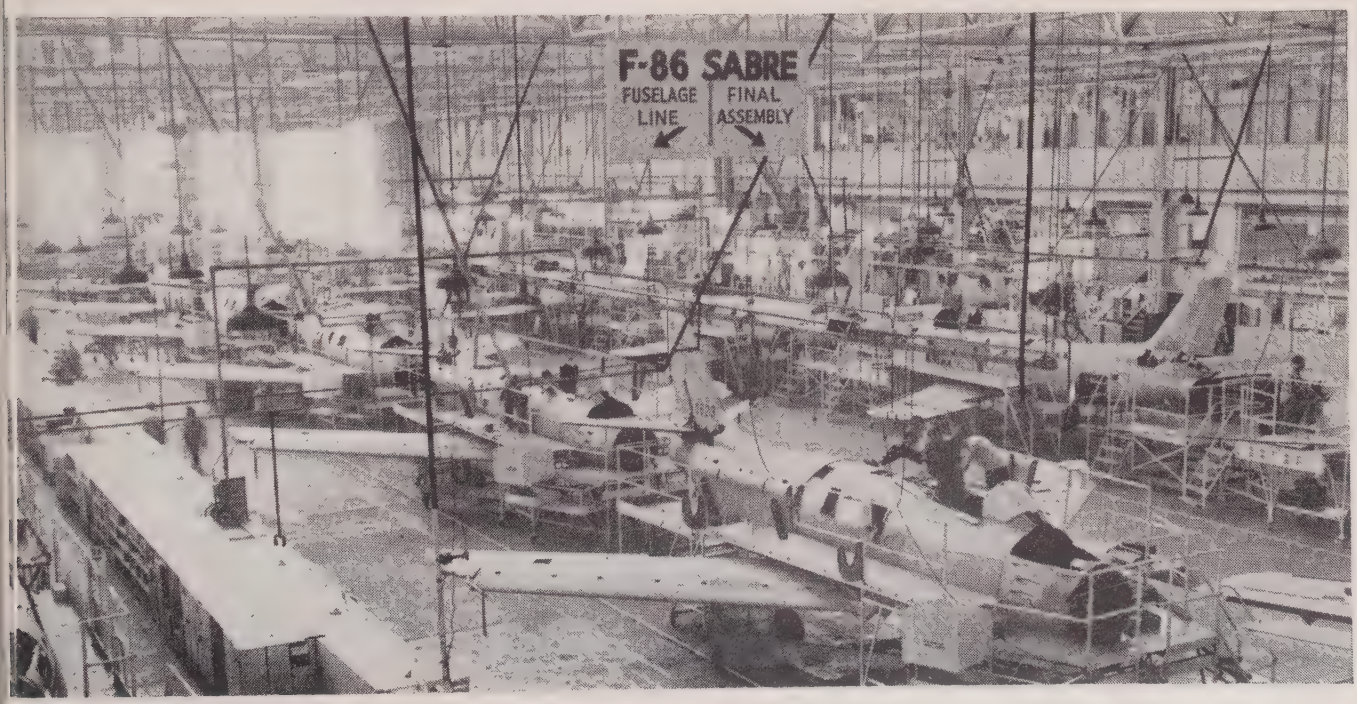
To permit even greater future expansion, these new facilities are being tooled up for a production capacity greater than that required by our current expansion program.

By negotiating production contracts with non-aircraft manufacturers, the Air Force hopes to achieve more than an increase in production and dispersal of aviation manufacturing facilities. Such action will serve to alleviate unemployment in industries which would have to curtail output because of restrictions on the use of certain raw materials for non-defense purposes. It will also enable the Air Force to make use of skilled labor forces where they are now located and to avoid making it necessary for workers to move their homes and families to areas where aircraft or other defense items are currently produced.

The Air Force is fully aware of the difficulties which will be encountered and the problems which must be solved by industry if the requirements of this rapid expansion program are to be met.

The problem of obtaining sufficient raw materials will be equalled or exceeded by the problem of obtaining skilled technicians.

I am confident, however, that the productive genius of the American industry, so brilliantly evidenced during World War II, can meet or surpass Air Force requirements in this time of need.



Aero-Engineer Job Specs

Survey discloses job specifications for engineers wishing to enter aeronautical field

AT the request of the Department of Defense the Engineers Joint Council during 1949-50 conducted a survey of selected engineering personnel. C. E. Davies, Secretary of the ASME was Chairman of the Committee on Survey. The records of nearly 64,000 engineers of high standing were brought together, and classified according to more than 250 specialties.

The Institute of the Aeronautical Sciences undertook to write the job specifications for engineers in the aeronautical field. Most of the descriptions listed below were condensed from the IAS specifications; the balance were obtained from within the aircraft industry.

Aeronautical Engineering

This field covers aircraft and flight control, including airframe, fuselage, powerplant, propellers, instruments, communication equipment, controls, etc.

Knowledge needed to work in this field includes mathematics, aerodynamics, mechanics, properties of materials, metallography of light alloys, airplane structures, vibrations, fluid flow, thermodynamics, internal-combustion engines.

Aeronautical Engineer, Junior

This job covers the solution of specifically assigned aerodynamic problems which require the application of standard and proven methods of analysis or the application of advanced theory which has been explained in detail by a higher skilled worker.

Also the application of mathematical formulae set out in hand books, technical reports and company manuals; the use of those portions which are clearly applicable to the problem; the obtaining of approval or instructions on those portions which may apply, but which require interpretation and explanation for the immediate problem.

Aerodynamics

This field covers the operation of natural laws affecting flight, based on the fundamental fields of fluid flow and dynamics. It covers the action of airfoils and other bodies in passing through air, and the action of forces upon them.

Knowledge needed to work in this field includes the 10 subjects listed under Aeronautical Engineering.

Aeronautical Design Structures

This field covers the actual structure of aircraft to meet the needs specified by the aerodynamics specialist. The structural engineer determines weights of individual craft components through selecting material and dimensions. The work of the Weight Engineer and engineers specializing in Stress Analysis is closely related here.

Special fields include study and remedy of vibration, flutter and transient loads. Development of test equipment, measuring and recording instruments are needed to perform this work.

Knowledge needed to work in this field includes the 10 subjects listed under Aeronautical Engineering.

Engineering Draftsman—A

A draftsman of this class prepares major engineering layout drawings or secondary airframe structure or equipment, from essential design information supplied by others. Develops some design of details not completely defined.

He must have practical knowledge of such problems as fits, finishes, tolerances, attachment patterns and manufacturing methods. He is responsible for specific assigned projects and checks detail assigned by him to others. He should be able to do sub-professional engineering work and highly skilled drafting.

Engineering Draftsman—B

A draftsman of this class prepares production drawings of parts, assemblies, or installations from furnished data which is complete and specific, or who details partially completed drawings which involve development of dependent detail according to established practice, or who prepares complete drawings from models, mock-ups or parts.

He is directed by senior draftsman, supervisor or engineer.

Engineering Draftsman—C

This is a worker who prepares detail part drawings or completes details of layout drawings in accord with standard practice, or who copies drawings with minor revisions, or traces or heavies-up completed drawings.

Normally requires about six months drafting training or experience.

Equipment Engineering

This field covers the design and installation of airborne equipment for aircraft, such as radio, heating, hydraulic, electrical or pressurizing equipment, actuating motors or parachutes. The equipment specialist may design in one or more diverse fields.

Knowledge needed to work in this field may include aerodynamics, structures, aircraft design, physiology, properties of materials, thermodynamics, mechanics and mathematics.

Flight-Test Engineering

This field covers the determination of the actual performance of aircraft in flight by observation through special instrumentation. The flight-test engineer conducts preliminary shake-down flights of new aircraft, observing engine cooling and vibration, and checking stability, controllability and maneuverability. Performance tests then cover stalling speeds, critical altitude, maximum level-flight speed, saw-tooth climbs, climb to ceiling, take-off and landing, range and endurance, spins and dives. Final stability tests determine the limiting conditions of dynamic stability in the aircraft.

Knowledge needed to work in this field includes the 10 subjects listed under Aeronautical Engineering, plus meterology.

Fluid Dynamics and Statics

This field covers the behavior of fluids in the liquid and gaseous form when flowing relative to an object and when at rest (incompressible and compressible). It is fundamental to Aerodynamics.

Knowledge required by engineers specializing in this field includes mathematics, physics, aerodynamics, mechanics, properties of materials, fluid flow.

(*Continued on page 60*)

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ELECTRONIC DEVELOPMENT
AIRCRAFT INSTRUMENTATION
STRUCTURAL TEST ENGIN[illegible]
TECHNICAL [illegible]

CHIF[illegible]
ENGIN[illegible]

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YOUR CAREER IN AVIATION

SPARTAN

All the above "HELP WANTED" Advertisements appeared in one issue of a national aviation magazine.

SPARTAN

A UNIVERSITY OF AVIATION

SCHOOL of AERONAUTICS
MAXWELL W. BALFOUR, DIRECTOR

COLLEGE of ENGINEERING
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Tulsa, Oklahoma

Please send your free Catalog immediately.

Name_____ Age____

Address_____

City_____ State_____

Indicate which of these branches interests you:

☐ Flight ☐ Instruments ☐ Flight Engineer
☐ Mechanics ☐ Aeronautical Engineering
☐ Radio ☐ Airline Maintenance Engineering
☐ Meteorology ☐ Management and Operations

Spartan is approved for training under the G. I. Bill of Rights

H 1951

Aero-Engineer Specs

(*Continued from page 58*)

Instrumentation and Control

This field covers the instruments and controls needed to operate aircraft, which may be divided into five classes. One set of instruments shows the condition of the aircraft; another the condition of the engines; a third set shows the position of aircraft components; a fourth set shows the electrical system; and a fifth set, communications system.

Controls are provided for manipulation of aircraft maneuvering components and of accessories.

Knowledge needed to work in this field includes mathematics, aerodynamics, mechanics, properties of materials, airplane structures, fluid flow, thermodynamics, internal-combustion engines, magnetism, electrical circuits, etc.

Materials and Process Engineering

This field covers the testing, evaluation and processing of materials used in the manufacture of aircraft. Materials and process engineers conduct tension, hardness, bending, impact, crushing, hydrostatic, torsion and fatigue tests of aircraft materials; make design recommendations on the basis of these tests; recommend the best ways of working, heat treating and finishing materials for specific applications and the best inspection methods.

Knowledge needed to work in this field includes aerodynamics, structures, properties of materials, metallurgy, metallography, manufacturing methods, materials markets and costs.

Powerplant Engineering

This field covers the design and manufacture of aircraft propulsion systems. Powerplant engineers develop reciprocating, turbojet, propeller-turbine, compound, ramjet, pulsejet and rocket engines for use in piloted and pilotless aircraft and missiles, and their auxiliary systems for cooling, ignition, fuel and lubrication. Compressor, diffuser, combustion chamber and turbine design are included in gas turbine powerplants.

Knowledge needed to work in this field includes mathematics, thermodynamics, reciprocating engines, aerodynamics, machine design, metallurgy, plane design, ballistics, meteorology.

Propellers

The propeller converts the torque developed by the powerplant into thrust for moving the aircraft through the air. Engineers specializing in this field must be able to design propellers for particular applications for speed, load and efficiency. Emphasis on propellers for use in transonic and supersonic speed ranges and for application in high-powered turboprop engines is indicated.

Knowledge needed to work in this field includes the 10 subjects listed under Aeronautical Engineering.

Servo-Mechanisms

Servo-mechanisms are automatic regulators that keep a controlled quantity matched to a reference or controlling quantity. These regulators have fast response, high accuracy, unattended operation and may be remote operating. They have three elements: (1) an error-detecting device, (2) an amplifier, and (3) and error-correcting device.

Servo-mechanisms may be used to regulate any measurable quantity such as voltage, speed, temperature, pressure, position, direction, torque, etc.

Knowledge needed by engineers working in this field include mathematics, aerodynamics, mechanics, properties of materials, metallography of light alloys, airplane structures, fluid flow, magnetism, electrical circuits, electronics, electrical machinery, hydraulics.

Structures Engineer, Junior

An engineer of this class solves specifically assigned structural analysis problems which require the application of standard and proven methods of analysis or the application of advanced theory which has been explained in detail by a higher skilled worker.

He should be able to apply mathematical formulae set out in handbooks, technical reports, and company manuals; use those portions which are clearly applicable to the problem, and obtain approval or instructions on those portions which may apply but which require interpretation and explanation.

Weight Engineer

This type of engineer undertakes problems in weight analysis and control for aircraft parts and assemblies such as the leading edge, wing box, nose section, powerplant and nacelle, surfaces and hydraulics, etc. He establishes allowable weights for the various components of a new project by revising and refining preliminary weight studies.

He also calculates weight of the various parts being designed, and suggests redesigns for overweight items. He may have to calculate cg of the aircraft as the result of the relocation of major units or changes in design.

Weight Engineer, Junior

An engineer of this class performs the more elementary problems involved in weight calculation and control. He calculates the weight working from drawings, and determines the cg of parts by applying standard formulae or making estimates.

He is required to use standard formulae to calculate section properties of aircraft components such as : polar moment of inertia and radius of gyration, weight distribution, balance of surfaces, etc. He also exercises weight control in connection with the layout of smaller parts and assemblies, working under close supervision.

Guided Missiles Engineering

Guided missiles covers projectiles used against aircraft, ships, submarines, structures, etc., that are launched from tubes, racks, and aircraft and whose flight path may be completely or partly directed from the firing station or aircraft by remote control.

Guided missiles include piloting and control systems, propulsion and fuel systems, casings heads and fuses, etc.

Guidance and control systems are based on radar beam, riding, homing, command, infra-red, celestial, Loran and long-range navigational principles. Arrangements include closed servomotor loops, gyroscopes, synchronized transmission systems, electrical and hydraulic servomotors, control surfaces, control jets, electronic circuits, etc.

Propulsion systems include ramjets, solid and liquid-fuel rocket engines, turbojets, pulsejets, combinations with conventional engines, etc.

Knowledge needed to work in this vital and rapidly expanding field includes advanced mathematics, physics, chemistry, metallurgy, mechanics of materials, properties of engineering materials, thermodynamics, heat engines, aerodynamics, fluid flow, hydraulics, servo mechanisms, explosives, electrical circuits and machinery, electronics, radio, radar, machine design.

Jet Engines

Jet-engine engineering covers the creation of a thrust or force to drive high-speed aircraft by burning refined petroleum fuels in a jet engine.

Knowledge needed to work in this field includes combustion, fluid flow, heat transmission, aerodynamics, mechanics, machine design, selection of fuels, materials and equipment.

Rocket Engines

Rocket engineering covers the development of a thrust or force to drive missiles or aircraft by the rapid burning of combustible mixtures in a rocket engine, which can function independently of the atmosphere.

A rocket engine contains a combustion chamber, an exhaust nozzle, injection system, control valves, starting system, fuel tank, oxidizer tank and pressurizing system. The pressure-producing system may utilize a gas turbine.

Knowledge needed to work in this field includes combustion, fluid flow, heat transmission, aerodynamics, mechanics, machine design, selection of fuels. materials and equipment.

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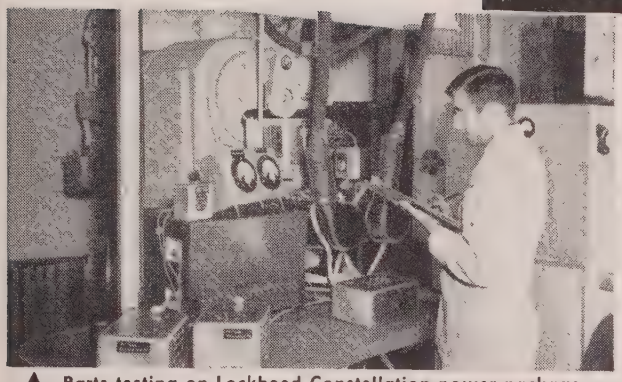
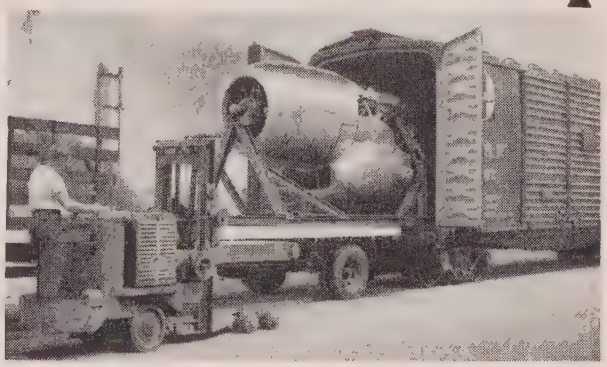


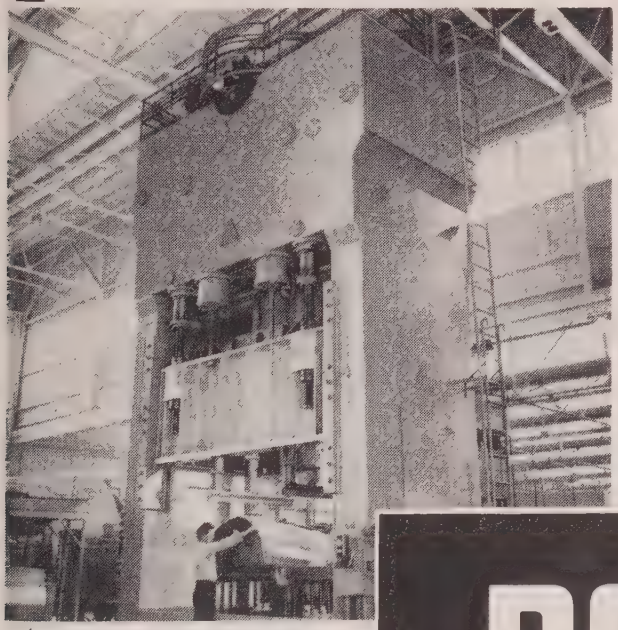
▲ Parts testing on Lockheed Constellation power package.

Plaster cast of part of a ROHR-built exhaust system. ▲

▲ A portion of the ROHR Engineering Department.



Completed B-50 power package being shipped to Boeing Airplane Company. ▲



▲ ROHR's giant 750-ton double-acting mechanical press.

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AIRCRAFT CORPORATION

YOU HAVE A GOOD JOB!

9 MILES SOUTHEAST OF SAN DIEGO, CALIFORNIA

CHULA VISTA, CALIFORNIA

Survey Shows Skills Needed

The following list, based on the AIA survey, indicates nearly 100 skills required at the present time by the rapidly expanding aircraft industry. Those marked with an asterisk (*) are in the most general demand.

Analysts
- Flight-test analysts
- Research-labor analysts
- Spare-parts analysts
- Stress analysts

**Assemblers*
- Aircraft assemblers
- Electrical assemblers
- Mechanical assemblers
- Sheet metal assemblers
- Structures assemblers

Buyers
Calculators
Checkers
Draftsmen
- Design draftsmen
- Detail draftsmen
- Layout draftsmen

Electricians
- *Aircraft electricians
- Construction electricians

**Electronics Technicians*
Engine Testers
Field and Service Representatives
Foundry Workers
Grinders
- Cutter grinders
- Internal and external grinders
- Tool grinders

Hand Finishers
IBM Tab Machine Operators
**Inspectors*
- Electronics inspectors
- Electrical inspectors
- Process and layout inspectors
- Radio inspectors
- Tooling inspectors

**Jig and Fixture Builders*
Loftsmen (aircraft)
**Machinists*
- Journeyman machinists
- Precision machinists
- Toolroom machinists

Machine Rebuilders
Machine Repairmen
**Machine Operators* (all types)
- Engine lathe operators
- Jig borer operators
- Milling machine operators
- Shaper operators
- Sheet metal machine operators
- Turret lathe operators

Mechanics
- *Aircraft assembly mechanics
- *A and E mechanics
- Field and service mechanics
- Flight-line mechanics
- Construction mechanics
- General assembly mechanics
- Modification mechanics
- Pre-flight mechanics
- Sheet metal mechanics
- *Radio and radar mechanics
- Tooling mechanics

Metal Fitters
Parts Listers
Plaster and Pattern Makers
Process Men
Production Illustrators
Production Clerks
Riveters
**Sheet Metal Workers*
Service Liaison Men
Technicians (mechanical & electrical)
Technical Writers
Template Makers
Testers
**Tool and Die Makers*
Tube Mock-up Men
Welders
- *Aircraft welders
- Aluminum welders
- Arc welders
- Combination welders

Wood Pattern Makers
Wood Workers (helicopter)

Engineers Now In Demand

According to a recent estimate there are some 350,000 graduate engineers in the U. S. Of these, it is further estimated that about 15,000, or just over 4 per cent, are aeronautical engineers of various kinds. This is a low percentage for an industry that depends on rapid development, advanced design and research.

As of January 1, 1951 total employment in the aircraft industry was about 400,000 (includes airframe, engine, propeller and accessory companies). Less than 5 per cent of this total are engineers. Results of a survey made by AIA for *SKYWAYS* magazine revealed that practically every aircraft manufacturer is already in urgent need of engineers in many categories, some needing them in practically all categories.

The following list indicates the types of engineering talent found to be in demand by various manufacturers.
- Aeronautical Engineers
- Aerodynamicists
- Aerophysicists
- Design Engineers
- Development Engineers
- Electronic Engineers
- Electrical Engineers
- Electro-Mechanical Engineers
- Engineering Assistants
- Engineering Draftsmen
- Helicopter Engineers
- Industrial Engineers
- Mechanical Engineers
- Production Engineers
- Research Engineers
- Thermodynamicists
- Tool Engineers

The following are also required in the designing and planning categories:
- Electrical Designers
- Electronics Designers
- Production Planners
- Production Expediters
- Tool Designers
- Tool Planners

If your training and experience is in any of the above fields and you are with a company not likely to be engaged in defense work, there is opportunity for you in the aircraft industry. Consult any aircraft factory listed below.

DIRECTORY OF COMPANIES

Aeronca Manufacturing Corporation, Middletown, Ohio. *Jack Linzie, Personnel Manager.*

Allison Division, General Motors Corp., Indianapolis 6, Ind. *K. H. Hoffman, Director of Personnel.*

Beech Aircraft Corporation, Wichita, Kansas. *Warren E. Blazier, Personnel Director.*

Bell Aircraft Corporation, P.O. Box 1, Buffalo 5, N.Y. *William H. Gunderson, Mgr. of Industrial Relations, R. C. Marks, Mgr. of Engineering Personnel.*

Boeing Airplane Company, (Seattle), 1301 Second Avenue, Seattle 14, Wash. *A. F. Logan, V-P in Charge of Industrial Relations, Les Isaacson, Per. Mgr.*

Boeing Airplane Company, (Wichita), Wichita 1, Kansas. *George Trombold, Industrial Relations Director, Phil Beatty, Personnel Manager.*

Cessna Aircraft Company, Wichita, Kansas, (also Hutchinson, Kansas). *Paul Elder, Personnel Manager* (Wichita), *Neil Whitney, Personnel Manager,* (Hutchinson).

Consolidated Vultee Aircraft Corp., San Diego, Calif. *D. C. Wilkens, Jr., Manager of Industrial Relations, H. E. Pasek, Employment Supervisor.*

Consolidated Vultee Aircraft Corp., Fort Worth, Texas. *R. J. Donnelly, Manager of Industrial Relations, F. F. Gignilliat, Employment Supervisor.*

Curtiss Wright Aircraft Corp., Main & Passaic St., Wood-Ridge, N.J. *Kenneth Schmidt, Industrial Relations Manager.*

Fairchild Engine & Airplane Corp., Hagerstown, Md. *S. A. Angotti, Director of Industrial Relations.*

General Electric Company, (AGT Divs.), 920 Western Avenue, Lynn, Mass. *C. F. Rock, Personnel Manager.*

General Electric Company, (AGT Divs.), Lockland 15, Ohio. *E. C. Foster, Personnel Manager.*

Grumman Aircraft Engineering Corp., Bethpage, Long Island, N.Y. *Paul S. Gilbert, Director of Person'l, Chester B. Abrams, Employment Manager, A. T. Wilder, Dir. of Engineering Training.*

Lockheed Aircraft Corporation, 1708 Empire Factory B-1, Burbank, Calif. *D. H. Cameron, Indust. Relation's Dir.*

Glenn L. Martin Company, Baltimore 3, Md. *J. M. Hollyday, Personnel Mgr.*

McDonnell Aircraft Corporation, Lambert Field, St. Louis 3, Mo. *W. R. Orthwein, Jr., Mgr., Personnel Div.*

North American Aviation, Inc., L. A. International Airport, Los Angeles 45. *D. R. Zook, Employment Director.*

North American Aviation, Inc., 4134 East Carson Street, Long Beach, Calif. *A. F. Urbiha, Personnel Director.*

North American Aviation, Inc., 12214 Lakewood Blvd., Downey, Calif. *A. W. Hale, Personnel Director.*

North American Aviation, Inc., 4300 East Fifth Avenue, Columbus 16, Ohio. *James Swanson, Employment Director.*

Northrop Aircraft, Inc., 1001 E. Broadway, Hawthorne, Calif. *D. C. Stadler, Personnel Manager.*

Piasecki Helicopter Corporation, Morton, Pa. *W. W. Bishop, Industrial Relations Dir.*

Piper Aircraft Company, Lock Haven, Pa. *Mrs. Evelyn Ellis, Employment Manager.*

Republic Aviation Corp., Farmingdale, Long Island, N. Y. *C. D. Ruyle, Dir. of Industrial Rel., Wayne Bates, Employment Manager, G. J. Hamelman, Dir. of Engineering Training.*

Ryan Aeronautical Company, Lindbergh Field, San Diego 12, Calif. *J. W. Bunnell, Personnel Manager.*

Sperry Gyroscope Company, Great Neck, Long Island, N. Y. *E. E. DaParma, Personnel Manager.*

Thompson Products, Inc., 23555 Euclid Avenue, Cleveland 17, Ohio. *R. S. Livington, Director of Person'l.*

United Aircraft Corporation: Pratt & Whitney Aircraft Div., 400 Main St., East Hartford, Conn. *T. R. Downs, Personnel Manager.*

Hamilton Standard Propeller Div., 400 Main St., East Hartford, Conn. *John P. Sullivan, Personnel Manager.*

Chance Vought Aircraft Div., P. O. Box 5907, Dallas, Texas. *Peter J. Wacks, Personnel Manager.*

Sikorsky Aircraft Div., South Avenue, Bridgeport Conn. *R. C. Banks, Per. Mgr.*

Job Estimates

With total funds of over $9 billion for aircraft and related procurement ($6.6 billion for Air Force and $2.5 for Air Navy), the American aircraft industry is set for the most rapid acceleration in its highly volatile history. With Charles E. Wilson calling the shots, the orders are now coming through, and it looks as though with priorities straightened out the materials will be available.

The number one problem is manpower, especially engineering and technically skilled labor. With the program hardly begun, reports from all over the country indicate that critical shortages already are the rule, not the exception.

According to a survey by AIA the pre-Korea employment total for 29 major producers (operating 36 plants, as below), was 243,000. At January 1, 1951 this had risen to 302,000, and by next July is expected to be 360,000.

By adding in the accessory companies not included in the above, the aviation departments of such companies as Firestone, Goodrich, Goodyear, General Electric (jet engines *are* included), and the subcontractors such as Temco, Rohr, Solar and thousands of others, the January 1st figure may well be around 400,000 and the July 1951 estimate up 25 per cent, or 500,000. Most of this increase will be in the highly skilled class, and there just doesn't seem to be that many skilled workers available. The mass production phase, in which semi-skilled help (including women and older workers) may be utilized, will come later.

The West Coast plants covered by the survey are: Boeing (Seattle); Convair and Ryan (San Diego), Douglas, Hughes, North American, Northrop and Aerojet (Los Angeles). In the Eastern region are included: Curtiss Wright (Wood-Ridge and Caldwell), Fairchild (Hagerstown), General Electric (Lynn), Grumman, Republic, Sperry (Long Island), Martin (Baltimore), Piasecki, Westinghouse (Philadelphia), Piper (Lock Haven, Pratt & Whitney, Hamilton Standard (Hartford), and Sikorsky (Bridgeport). In the Mid-West and Southwest are Beech, Boeing and Cessna, (Wichita), McDonnell (St. Louis), Chance Vought (Dallas) and Convair (Ft. Worth). Included in the Great Lakes area are Aeronca (Middletown), Allison (Indianapolis), Bendix (Detroit), General Electric (Lockland) and Thompson Products (Cleveland).

Many newly activated wartime plants will be in the picture by the end of the year, further boosting the employment total. These include Republic-General Motors (Kansas City); P & W—Ford; Fairchild - Kaiser; Studebaker (jets); Douglas (Tulsa).

APPLICATION FOR EMPLOYMENT

Name (in full)	Social Security No.	Date
Address		Telephone No.

Personal Record

Married / Single	No. of Children	Date of Birth	City of Birth	Height	Weight	Color Hair	Color Eyes

Educational Record

Last Elementary School	Grade Completed	Date Left or Graduated
Last High School	Grade Completed	Date Left or Graduated
College or Univ.	Years Completed	Did You Graduate?
Major Subjects	Year Left or Grad.	Degree Obtained

Employment Record

Last or Present Employer	City	Occupation	From - To	Hourly or Weekly Rate
Previous Employer				
Previous Employer				
Previous Employer				
Previous Employer				

Military Record

Branch of Service	From - To	Rank	Serial No.	Type of Discharge	Draft Status

Family Record

Father's Name	Address	Where Employed	Where Born
Mother's Name			

Position for which you are applying						Salary or wage required
Are you available for Night Shift work?	Yes	No	Do you own a car?	Yes	No	

To what Organizations (other than Trade Unions) do you belong?

Have you ever been arrested for any offense other than minor traffic violations? Yes No

(If answer is Yes, explain on a separate sheet)

Give three references (not relatives or employers)

Name	Address	City	Years known
Name	Address	City	
Name	Address	City	

Signature of Applicant

Supplementary Information as to education, training and experience regarding your interest in and qualifications for a job in the aircraft industry (use another sheet if necessary)

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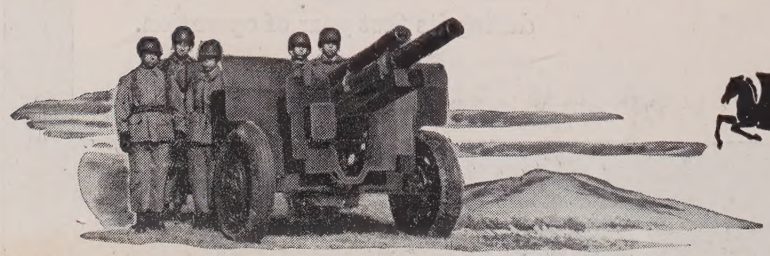
The dependable C-119 Packet is the post-war high-point of Fairchild research and development in the field of all-purpose transports. Only aircraft specially designed to do the job, could do it to such maximum advantage.

Packets, specially engineered and ruggedly constructed to meet the needs of our unified air and ground forces, are proving themselves in varied military operations throughout the world.



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